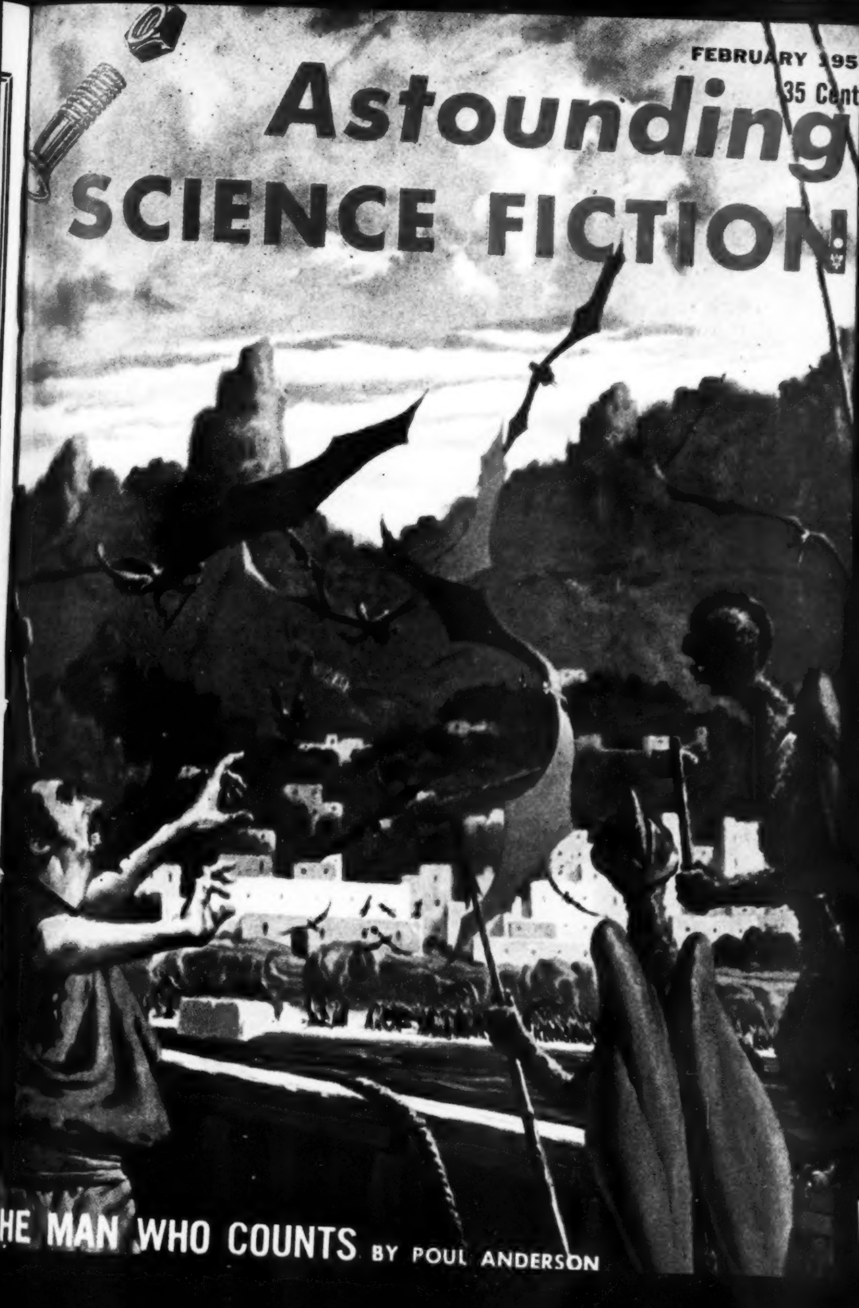

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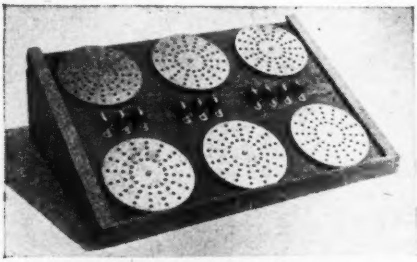

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Astounding SCIENCE FICTION

VOLUME LX • NUMBER 6 **February, 1958**

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COVER BY VAN DONGEN • *Illustrations by Freas, Martinez and van Dongen*

SYMBOL: *It looks workable. What's wrong?*

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DEMONSTRATION

PART II

FOR all the years of human civilization, since first men conceived of the concept "Truth," they have been seeking ways of finding Truth. The search began long before history; the existence of language itself implies a concept of "true" and "false," for only symbols can be untrue-to-reality. An action is, of necessity, what it is; only when action is endowed with symbolic meaning is there a possibility of a correlation other than the one-to-one value of autocorrelation.

We're still at it—and we're still using some highly inadequate methods. The oldest method of finding truth is still with us: "I'm right and you were wrong, and the proof is that you're dead." This particular method of epistemology, of demonstration-of-rightness, is now used primarily at the international level, but it's still with us.

Then there's Trial by Ordeal, a modified version of the older method. If a man was accused of theft, and denied it, he was invited to stick his hand in molten lead. If the hand came off that proved he was lying, and simultaneously applied the penalty of theft—amputation of the hand. If it didn't burn off, that proved he was telling the truth, and he wasn't punished for theft. Simple—neat—very satisfactory. To others, that is.

Trial by Combat, with refinement to Trial by Champions, came somewhat later. Trial by Combat proved somewhat unsatisfactory when the disputing parties happened to be a young girl and a seasoned warrior, so the modification of Champions was introduced.

These methods, too, we have still with us.

But one of the most important methods, in all ages, has been Trial by Orthodoxy—trial by comparison of What Every Right Thinking Person Knows with what the innovator says. Sometimes this was called sacrilege, when the local godling was

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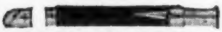

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involved, and sometimes it was more or less a civil offense, when a tribal taboo was involved.

The most potent of the determining factors is, and long has been, the strongly held beliefs of the majority of Constituted Authorities. Chief Witch Doctor—tribal King—Learned Doctors—in whatever form, the problem has existed that when one individual stands up and says: "They are all wrong, and I am right!" the presumptive evidence strongly indicates the lone individual is off his nut.

We can call this the Galileo Problem. It could as well be given any of a hundred other names; the essence of it is the problem of the lone individual standing up for an idea inherently contrary to the tenets of the most highly trained experts of his time and place. Whether it be Ugh, the inventive cave man vs. the tribal Elders, or Bill Blow, amateur scientist of 1958 vs. the highly trained experts—it's the same fundamental problem.

Demonstration is not enough. For one thing, Galileo's greatest problem was that he could not get the Constituted Authorities to look through his telescope. They had too many important things to do to bother with any such obvious, crackpot nonsense.

The normal sequence of events in the effort of the Constituted Authorities to suppress the obnoxious innovator is, first, ignoring him. (Maybe he'll get tired and go away.) Second, direct harassment and suppression. (He's got to be shut up . . . but don't make a martyr of him, or it'll make things unpleasant otherwise.) Third, increased harassment of the innovator, and secondary harassment applied to those who do pay attention to him. (If we distract him with something else to worry about, even if he doesn't shut up and forget his nonsense, he'll be so busy with the troubles we give him, he won't have time to cause trouble. And we'll drive his audience away.) Finally, of course, the innovator is violently attacked and martyred, if he is so obnoxiously persistent and loud-mouthed as to continue to be a nuisance.

Any ordinary man gets discouraged somewhere along the line; the ones that make history are usually those who get themselves martyred.

In more modern times, when lethal violence has been very unpopular, a number of individuals and groups have definitely sought violent reprisal from Constituted Authority for the purpose of bringing their claims and problems into public sight. An outstanding example is the Suffragette movement; in England the women went about smashing His Majesty's post boxes for the express purpose of attracting attention—to break through the ignore-them tactic of the Constituted Authorities.

Galileo was typical of the ultra-persistent innovator; ignoring him didn't work, because he was a first-class showman, propagandist, and promotion agent. Modern promotion agents have pulled such fancy publicity gags as selling refrigerators to Eskimos, finding a needle in a haystack, or hatching an ostrich egg. It doesn't prove anything—but it attracts attention.

The major effort of the Constituted Authorities is to prevent the innovator getting anyone to lend him their ears; to block his communication lines. No matter how good an idea you have, it won't do any good if you can't communicate it. Plug up all communication lines, and the innovator's idea dies with him.

Naturally, the innovator who is a hot-shot promotion agent, showman, and propaganda artist is the one that will make his mark in history; the other innovators normally get forgotten behind the communication blocks installed around them.

Galileo was as fine a promoter as any modern promotion agent; he pulled a number of the most fabulous promotion gags in history—so good that people are still talking about them centuries later. That stunt of dropping weights from the top of the Tower of Pisa, for instance—as nice an attention-getter as any modern gag-artist could contrive! And totally unnecessary to demonstrate a physical fact; any convenient second- or third-story window, on someone's private courtyard, would have demonstrated the principle with equal validity, and far greater convenience. But could you think of any neater publicity gag?

A really smart man, Galileo got himself arrested, stirred up all the stink of martyrdom . . . and got away with it beautifully.

It doesn't do a man any good to be right; the Jews in Germany may have been right, but the Constituted Authorities of Nazidom slaughtered quite a few of them just the same.

The lovely old idea that Right Will Triumph is basically the rationalization-justification for Trial by Ordeal. If the man is right, his hand won't fall off when thrust into molten lead, because Right is Sure To Triumph. Therefore when his hand falls off, that proves he wasn't right. And you mustn't question that, either . . . or all the times you yourself have triumphed won't be proof that you were right!

Most of the men with new, right ideas can be expected to be crushed. Given an average individual, with an unusual, but correct idea, flatly in contradiction of all "known" Truths, what is the probability that one man will succeed against all Constituted Authority?

Oh . . . but he has a *right* idea, so naturally he'll triumph! All history shows that!

Sure . . . and if Hitler had won the Battle of England, history would show that that war criminal, Winston Churchill, had been executed for his crime, too. Then there was that traitor, rebel, and outlaw, George Washington, who got the price taken off his head by winning a physical-military battle, not by

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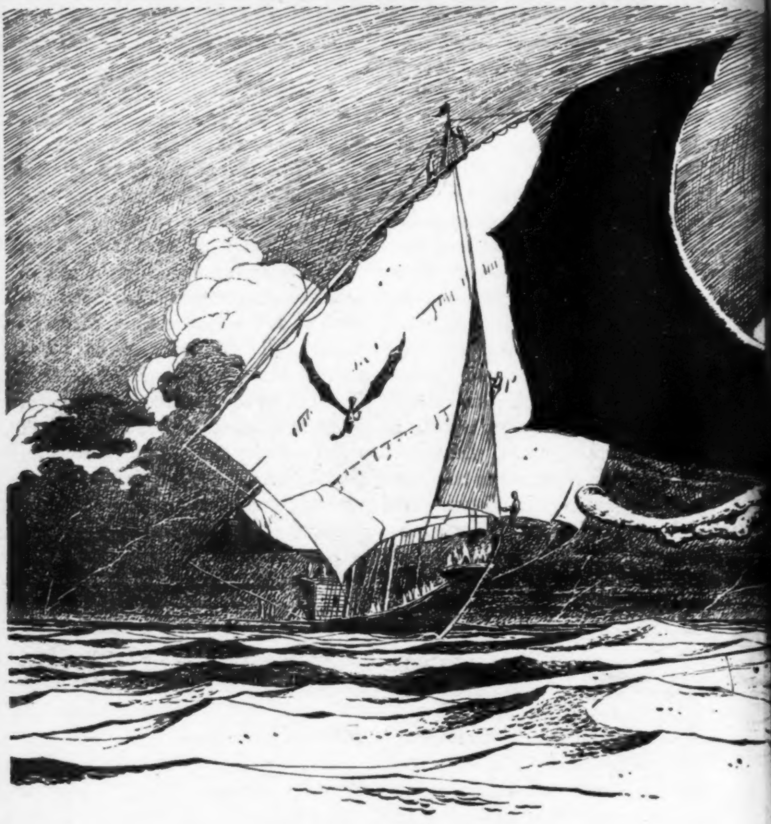


THE MAN WHO COUNTS

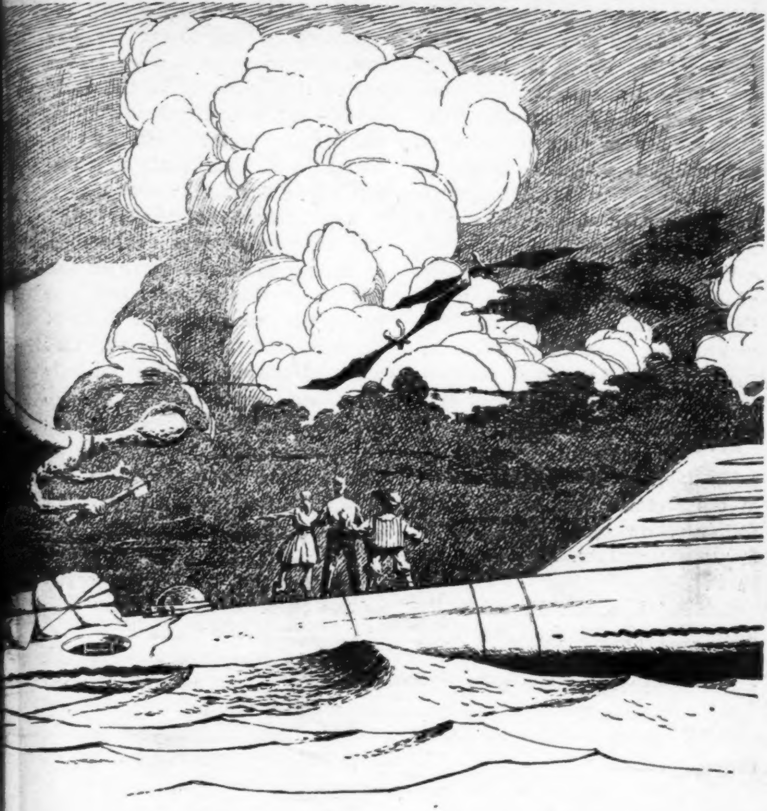
BY

POUL ANDERSON

Illustrated by van Dongen

The First of Three Parts.

It was a nice enough planet, and the natives weren't bad people...but the situation was very, very bad. All the local food was one hundred per cent nonedible for human beings!



I

GRAND Admiral Syranax hyr Urnan, hereditary Commander-in-Chief of the Fleet of Drak'ho, Fisher of the Western Seas, Leader in Sacrifice, and Oracle of the Lodestar, spread his wings and brought them together again in an astonished thunderclap. For a moment, it snowed papers from his desk.

"No!" he said. "Impossible! There's some mistake."

"As my Admiral wills it," Chief Executive Officer Delp hyr Orikan bowed sarcastically. "The scouts saw nothing."

Anger crossed the face of Captain

T'heonax hyr Urnan, son of the Grand Admiral and therefore heir apparent. His upper lip rose until the canine tushes showed, a white flash against the dark muzzle.

"We have no time to waste on your insolence, Executive Delp," he said coldly. "I would advise my father to dispense with an officer who has no more respect."

Under the embroidered cross-belts of office, Delp's big frame tautened. Captain T'heonax glided one step toward him. Tails curled back and wings spread, instinctive readiness for battle, until the room was full of their bodies and their hate. With a calculation which made it seem accidental, T'heonax dropped a hand to the obsidian rake at his waist. Delp's yellow eyes blazed and his fingers clamped on his own tomahawk.

Admiral Syranax's tail struck the floor. It was like a fire-bomb going off. The two young nobles jerked, remembered where they were, and slowly, muscle by muscle laying itself back to rest under the sleek brown fur, they relaxed.

"Enough!" snapped Syranax. "Delp, your tongue will flap you into trouble yet. T'heonax, I've grown bored with your spite. You'll have your chance to deal with personal enemies, when I am fish food. Meanwhile, spare me my few able officers!"

It was a firmer speech than anyone had heard from him for a long time. His son and his subordinate recalled that this grizzled, dim-eyed, rheumatic creature had once been the conqueror of the Maion Navy—a thousand wings of enemy leaders had rattled grisly from the mastheads—and was still their chief in the war against the Flock. They assumed the all-fours crouch of respect and waited for him to continue.

"Don't take me so literally, Delp," said the admiral in a milder tone. He reached to the rack above his desk and got down a long-stemmed pipe and began stuffing it with flakes of dried sea driss from the pouch at his waist. Meanwhile, his stiff old body fitted itself more comfortably into the wood-and-leather seat. "I was quite surprised, of course, but I assume that our scouts still know how to use a telescope. Describe to me again exactly what happened."

"A patrol was on routine reconnaissance about 30 obdisai north-north-west of here," said Delp with care. "That would be in the general area of the island called . . . I can't pronounce that heathenish local name, sir; it means Banners Flew."

"Yes, yes," nodded Syranax. "I have looked at a map now and then, you know."

T'heonax grinned. Delp was no courtier. That was Delp's trouble. His grandfather had been a mere Sailmaker, his father never advanced beyond the captaincy of a single raft. That was after the family had been ennobled for heroic service at the Battle of Xarit'ha, of course—but they had still been very minor peers, a tarry-handed lot barely one cut above their own crewfolk.

Syranax, the Fleet's embodied response to these grim days of hunger and uprooting, had chosen officers on a basis of demonstrated ability, and nothing else. Thus it was that simple Delp hyr Orikan had been catapulted in a few years to the second highest post in Drak'ho. Which had not taken the rough edges off his education, or taught him how to deal with *real* nobles.

If Delp was popular with the common sailors, he was all the more disliked by many aristocrats—a parvenu, a boor, with the nerve to wed a sa Axollon! Once the old admiral's protecting wings were folded in death—

T'heonax savored in advance what would happen to Delp hyr Orikan. It would be easy enough to find some nominal charge.

The executive gulped. "Sorry, sir," he mumbled. "I didn't mean . . . we're still so new to this whole sea . . . well. The scouts saw this drifting object. It was like nothing ever heard of before. A pair of 'em flew back to report and ask for advice. I went to look for myself. Sir, it's true!"

"A floating object—six times as long as our longest canoe—like ice, and yet not like ice—" The admiral shook his gray-furred head. Slowly, he put dry tinder in the bottom of his firemaker. But it was with needless violence that he drove the piston down into the little hardwood cylinder. Removing the rod again, he tilted fire out into the bowl of his pipe, and drew deeply.

"The most highly polished rock crystal might look a bit like that stuff, sir," offered Delp. "But not so bright. Not with such a *shimmer*."

"And there are animals scurrying about on it?"

"Three of them, sir. About our size, or a little bigger, but wingless and tailless. Yet not just animals either . . . I think . . . they seem to wear clothes and—I don't think the shining thing was ever intended as a boat, though. It rides abominably, and appears to be settling."

"If it's not a boat, and not a log washed off some beach," said T'heonax, "then where, pray tell, is it from? The Deeps?"

"Hardly, captain," said Delp irritably. "If that were so, the creatures on it would be fish or sea mammals or—well, adapted for swimming, anyway. They're not. They look like typical flightless land forms, except for having only four limbs."

"So they fell from the sky, I presume?" sneered T'heonax.

"I wouldn't be at all surprised," said Delp in a very low voice. "There isn't any other direction left."

T'heonax sat up on his haunches, mouth falling open. But his father only nodded.

"Very good," murmured Syranax. "I'm pleased to see a little imagination around here."

"But where did they fly *from?*" exploded T'heonax.

"Perhaps our enemies of Lannach would have some account of it," said the admiral. "They cover a great deal more of the world every year than we do in many generations; they meet a hundred other barbarian flocks down in the tropics, and exchange news."

"And females," said T'heonax. He spoke in that mixture of primly disapproving voice and lickerish overtones with which the entire Fleet regarded the habits of the migrators.

"Never mind that," snapped Delp.

T'heonax bristled. "You deck-swabber's whelp, do you dare—"

"Shut up!" roared Syranax.

After a pause, he went on: "I'll have inquiries made among our prisoners. Meanwhile, we had better send a fast canoe to pick up these beings before that object they're on founders."

"They may be dangerous," warned T'heonax.

"Exactly," said his father. "If so, they're better in our hands than if, say, the Lannach'honai should find them and make an alliance. Delp, take the *Nemnis,* with a reliable crew, and crowd sail on her. And bring along that fellow we captured from Lannach, what's his name, the professional linguist—"

"Tolk?" The executive stumbled over the unfamiliar pronunciation.

"Yes. Maybe he can talk to them. Send scouts back to report to me, but stand well off the main Fleet until you're sure that the creatures are harmless to us. Also till I've allayed whatever superstitious fears about sea demons there are in the lower classes. Be polite if you can, get rough if you must. We can always apologize later . . . or toss the bodies overboard. Now, jump!"

Delp jumped.

II

Desolation walled him in.

Even from this low, on the rolling, pitching hull of the murdered skycruiser, Eric Wace could see an immensity of horizon. He thought that the sheer size of that ring, where frost-pale heaven met the gray which was cloud and storm-scud and great marching waves, was enough to terrify a man. The likelihood of death had been faced before, on Earth, by many of his forebears; but Earth's horizon was not so remote.

Never mind that he was a hundred-odd light-years from his own sun. Such distances were too big to be understood: they became mere numbers, and did not frighten one who reckoned the pseudo-speed of a secondary-drive spaceship in parsecs per week.

Even the ten thousand kilometers of open ocean to this world's lone human settlement, the trading post, was only another number. Later, if he lived, Wace would spend an agonized time wondering how to get a message across that emptiness, but at present he was too occupied with keeping alive.

But the breadth of the planet was something he could see. It had not struck him before, in his eighteen-month stay; but then he had been insulated, psychologically as well as physically, by an unconquerable machine technology. Now he stood alone on a sinking vessel, and it was twice as far to look across chill waves to the world's rim as it had been on Earth.

The skycruiser rolled under a savage impact. Wace lost his footing and slipped across curved metal plates. Frantic, he clawed for the light cable which lashed cases of food to the navigation turret. If he went over the side, his boots and clothes would pull him under like a stone. He caught it in time and strained to a halt. The disappointed wave slapped his face, a wet salt hand.

Shaking with cold, Wace finished tucking the last box into place and crawled back toward the entry hatch. It was a miserable little emergency door, but the glazed promenade deck, on which his passengers had strolled while the cruiser's gravbeams bore her through the sky, was awash, its ornate bronze portal submerged.

Water had filled the smashed engine compartment when they ditched. Since then it had been seeping around twisted bulkheads and strained hull plates, until the whole thing was about ready for a last long dive to the sea bottom.

Wind passed gaunt fingers through his drenched hair and tried to hold open the hatch when he wanted to close it after him. He had a struggle against the gale . . . Gale? Hell, no! It had only the velocity of a stiffish breeze—but with six times the atmospheric pressure of Earth behind it, that breeze struck like a Terrestrial storm. Damn PLC 2987165 II! Damn the PL itself, and damn Nicholas van Rijn, and most particularly damn Eric Wace for being fool enough to work for the Company!

Briefly, while he fought the hatch, Wace looked out over the coaming as if to find rescue. He glimpsed only a reddish sun, and great cloud-banks dirty with storm in the north, and a few specks which were probably natives.

Satan fry those natives on a slow griddle, that they did not come to help! Or at least go decently away while the humans drowned, instead of hanging up there in the sky to gloat!

"Is all in order?"

Wace closed the hatch, dogged it fast, and came down the ladder. At its foot, he had to brace himself against the heavy rolling. He could still hear waves beat on the hull, and the wind-yowl.

"Yes, my lady," he said. "As much as it'll ever be."

"Which isn't much, not?" Lady Sandra Tamarin played her flashlight over him. Behind it, she was only another shadow in the darkness of the dead vessel. "But you look a saturated rat, my friend. Come, we have at least fresh clothes for you."

Wace nodded and shrugged out of his wet jacket and kicked off the squelching boots. He would have frozen up there without them—it couldn't be over five degrees C.—but they seemed to have blotted up half the ocean. His teeth clapped in his head as he followed her down the corridor.

He was a tall young man of North American stock, ruddy-haired, blue-eyed, with bluntly squared-off features above a well-muscled body. He had begun as a warehouse apprentice at the age of twelve, back on Earth, and now he was the Solar Spice & Liquors Company's factor for the entire planet known as Diomedes. It wasn't exactly a meteoric rise—Van Rijn's policy was to promote according to results, which meant that a quick mind, a quick gun, and an eye firmly held to the main chance were favored. But it had been a good solid career, with a future of posts on less isolated and unpleasant worlds, ultimately an executive position back Home and—and what was the use, if alien waters were to eat him in a few hours more?

At the end of the hall, where the navigation turret poked up, there was again the angry copper sunlight, low in the wan smoky-clouded sky, south of west as day declined. Lady Sandra snapped off her torch and pointed to a coverall laid out on the desk. Beside it were the outer garments, quilted, hooded, and gloved, he would need before venturing out again into the pre-equinoctial springtime. "Put on everything," she said. "Once the boat starts going down, we will have to leave in a most horrible hurry."

"Where's Freeman van Rijn?" asked Wace.

"Making some last-minute work on the raft. That one is a handy man with the tools, not? But then, he was once a common spacehand."

Wace shrugged and waited for her to leave.

"Change, I told you," she said.

"But—"

"Oh." A thin smile crossed her face. "I thought not there was a nudity taboo on Earth."

"Well . . . not exactly, I guess, my lady . . . but after all, you're a noble born, and I'm only a trader—"

"From republican planets like Earth come the worst snobs of all," she said. "Here we are all human beings. Quickly, now, change. I shall turn my back if you desire so."

Wace scrambled into the outfit as fast as possible. Her mirth was an unexpected comfort to him. He considered what luck always appeared to befall that pot-bellied old goat Van Rijn.

It wasn't right!

The colonists of Hermes had been, mostly, a big fair stock, and their descendants had bred true: especially the aristocrats, after Hermes set up as an autonomous grand duchy during the Breakup. Lady Sandra Tamarin was nearly as tall as he, and shapeless winter clothing did not entirely hide the lithe full femaleness of her. She had a face too strong to be pretty—wide forehead, wide mouth, snub nose, high cheekbones—but the large smoky-lashed green eyes, under heavy dark brows, were the most beautiful Wace had ever seen. Her hair was long, straight, ash-blond, pulled into a knot at the moment but he had seen it floating free under a coronet by candlelight—

"Are you quite through, Freeman Wace?"

"Oh . . . I'm sorry, my lady. I got to thinking. Just a moment!" He pulled on the padded tunic, but left it unzipped. There was still some human warmth lingering in the hull. "Yes. I beg your pardon."

"It is nothing." She turned about. In the little space available, their forms brushed together. Her gaze went out to the sky. "Those natives, are they up there yet?"

"I imagine so, my lady. Too high for me to be sure, but they can go up several kilometers with no trouble at all."

"I have wondered, Trader, but got no chance to ask. I thought not there could be a flying animal the size of a man, and yet these Diomedeans have a six-meter span of bat wings. How?"

"At a time like *this* you ask?"

She smiled. "We only wait now for Freeman van Rijn. What else shall we do but talk of curious things?"

"We . . . help him . . . finish that raft soon or we'll all go under!"

"He told me he has just batteries enough for one cutting torch, so anyone else is only in the way. Please continue talking. The high-born of Hermes have their customs and taboos, also for the correct way to die. What else is man, if not a set of customs and taboos?" Her husky voice was light, she smiled a little, but he wondered how much of it was an act.

He wanted to say: We're down in the ocean of a planet whose life is poison to us. There is an island a few score kilometers hence, but we only know its direction vaguely. We may or may not complete a raft in time, patched together out of old fuel drums, and we may or may not get our human-type rations loaded on it in time, and it may or may not weather the storm brewing there in the north. Those were natives who swooped low above us a few hours ago, but since then they have ignored us . . . or watched us . . . anything except offer help.

Someone hates you or old Van Rijn, he wanted to say. Not me, I'm not important enough to hate. But Van Rijn is the Solar Spice & Liquors Company, which is a great power in the Polesotechnic League, which is *the* great power in the known galaxy. And you are the Lady Sandra Tamarin, heiress to the throne of an entire planet, if you live; and you have turned down many offers of marriage from its decaying, inbred aristocracy, publicly preferring to look elsewhere for a father for your children, that the next Grand Duke of Hermes may be a man and not a giggling clothes horse; so no few courtiers must dread your accession.

Oh, yes, he wanted to say, there are plenty of people who would gain if either Nicholas van Rijn or Sandra Tamarin failed to come back. It was a calculated gallantry for him to offer you a lift in his private ship, from Antares where you met, back to Earth, with stopovers at interesting points along the way. At the very least, he can look for trade concessions in the Duchy. At best . . . no, hardly a formal alliance; there's too much hell in him; even you—most strong and fair and innocent—would never let him plant himself on the High Seat of your fathers.

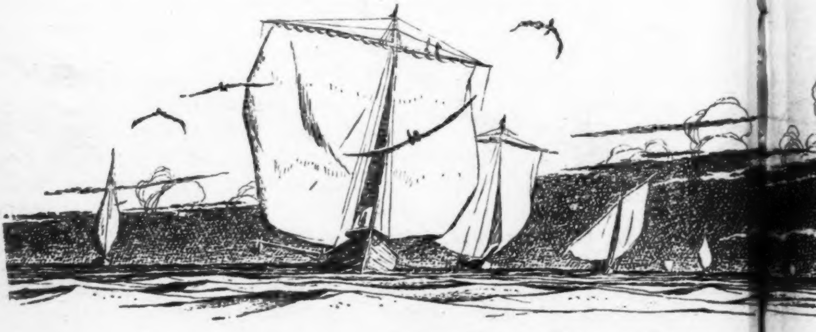
But I wander from the subject, my dear, he wanted to say; and the subject is, that someone in the spaceship's crew was bribed. The scheme was well-hatched; the someone watched his chance. It came when you landed on Diomedes, to see what a really new raw planet is like, a planet where even the main continental outlines have scarcely been mapped, in the mere five years that a spoonful of men have been here. The chance came when I was told to ferry you and my evil old boss to those sheer mountains, halfway around this world, which have been noted as spectacular scenery. A bomb in the main generator . . . a slain crew, engineers and stewards gone in the blast, my co-pilot's skull broken when we ditched in the sea, the radio shattered . . . and the last wreckage is going to sink long before they begin to worry at Thursday Landing and come in search of us . . . and assuming we survive, is there the slightest noticeable chance that a few skyboats, cruising a nearly unmapped world twice the size of Earth, will happen to see three human flyspecks on it?

Therefore, he wanted to say, since all our schemings and posturings have brought us merely to this, it would be well to forget them in what small time remains, and kiss me instead.

But his throat clogged up on him, and he said none of it.

"So?" A note of impatience entered her voice. "You are very silent, Freeman Wace."

"I'm sorry, my lady," he mumbled. "I'm afraid I'm no good at



making conversation under . . . uh, these circumstances."

"I regret I have not qualifications to offer to you the consolations of religion," she said with a hurtful scorn.

A long gray-bearded comber went over the deck outside and climbed the turret. They felt steel and plastic tremble under the blow. For a moment, as water sheeted, they stood in a blind roaring dark.

Then, as it cleared, and Wace saw how much farther down the wreck had burrowed, and wondered if they would even be able to get Van Rijn's raft out through the submerged cargo hatch, there was a whiteness that snatched at his eye.

First he didn't believe it, and then he wouldn't believe because he dared not, and then he could no longer deny it.

"Lady Sandra." He spoke with immense care; he *must* not scream his news at her like any low-born Terrestrial.

"Yes?" She did not look away from her smoldering contemplation of the northern horizon, empty of all but clouds and lightning.

"There, my lady. Roughly southeast, I'd guess . . . sails, beating upwind."

"What?" It was a shriek from her. Somehow, that made Wace laugh aloud.

"A boat of some kind," he pointed. "Coming this way."

"I didn't know the natives were sailors," she said, very softly.

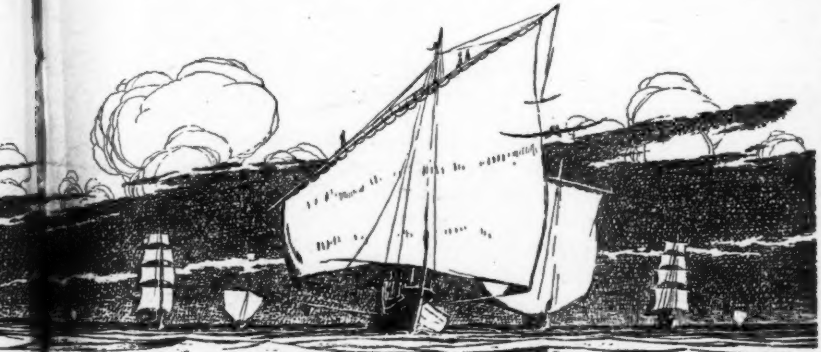
"They aren't, my lady—around Thursday Landing," he replied. "But this is a big planet. Roughly four times the surface area of Earth, and we only know a small part of one continent."

"Then you know not what they are like, these sailors?"

"My lady, I have no idea."

III

Nicholas van Rijn came puffing up the companionway at their shout. "Death and damnation!" he roared.



"A boat, do you say, *ja*? Better for you it is a shark, if you are mistaken. By damn!" He stumped into the turret and glared out through salt-encrusted plastic. The light was dimming as the sun went lower and the approaching storm clouds swept across its ruddy face. "So! Where is it, this pestilential boat?"

"There, sir," said Wace. "That schooner—"

"Schooner! Schnork! Powder and balls, you cement head, that is a yawl rig . . . no, wait, by damn, there is a furled square sail on the mainmast too, and, yes, an outrigger— *Ja,* the way she handles, she must have a regular rudder— Good saints help us! A bloody-be-damned-to-blazes dugout!"

"What else do you expect, on a planet without metals?" said Wace. His nerves were worn too thin for him to remember the deference due a merchant prince.

"Hm-m-m . . . coracles, maybe so, or rafts or catamarans— Quick, dry clothes! Too cold it is for brass monkeys!"

Wace grew aware that Van Rijn was standing in a puddle, and that bitter sea water streamed from his waist and legs. The storeroom where he had been at work must have been awash for—for hours!

"I know where they are, Nicholas." Sandra loped off down the corridor. It slanted more ominously every minute, as the sea pushed in through a ruined stern.

Wace helped his chief off with the sopping coverall. Naked, Van Rijn suggested . . . what was that extinct ape? . . . a gorilla, two meters tall, hairy and huge-bellied, with shoulders like a brick warehouse, loudly bawling his indignation at the cold and the damp and the slowness of assistants. But rings flashed on the thick fingers and bracelets on the wrists, and a little St. Dismas medal swung from his neck. Unlike Wace, who found a crew cut and a clean shave more practical, Van Rijn let his oily black locks hang curled and perfumed in the latest mode, flaunted a goatee on his triple chin and intimidating waxed mustaches beneath the great hook nose.

He rummaged in the navigator's cabinet, wheezing, till he found a bottle of rum. "Ahhh! I knew I had the devil-begotten thing stowed somewhere." He put it to his frog-mouth and tossed off several shots at a gulp. "Good! Fine! Now maybe we can begin to be like self-respectful humans once more, *nie?"*

He turned about, majestic and globular as a planet, when Sandra came back. The only clothes she could find to fit him were his own, a peacock outfit of lace-trimmed shirt, embroidered waistcoat, shimmersilk culottes and stockings, gilt shoes, plumed hat, and holstered blaster. "Thank you," he said curtly. "Now, Wace, while I dress, in the lounge you will find a box of Perfectos and one small bottle applejack. Please to fetch them, then we go outside and meet our hosts."

"Holy St. Peter!" cried Wace. "The lounge is under water!"

"Ah?" Van Rijn sighed, woebegone. "Then you need only get the applejack. Quick, now!" He snapped his fingers.

Wace said hastily: "No time, sir. I still have to round up the last of our ammunition. Those natives could be hositle."

"If they have heard of us, possible so," agreed Van Rijn. He began donning his natural-silk underwear. "*Brrrr!* Five thousand candles I would give to be back in my office in Jakarta!"

"To what saint do you make the offer?" asked Lady Sandra.

"St. Nicholas, natural—my namesake, patron of wanderers and—"

"St. Nicholas had best get it in writing," she said.

Van Rijn purpled; but one does not talk back to the heiress apparent of a nation with important trade concessions to offer. He took it out by screaming abuse after the departing Wace.

It was some time before they were outside; Van Rijn got stuck in the emergency hatch and required pushing, while his anguished basso obscenities drowned the nearing thunder. Diomedes' period of rotation was only twelve and a half hours, and this latitude, thirty degrees north, was still on the winter side of equinox; so the sun was toppling seaward with dreadful speed. They clung to the lashings and let the wind claw them and the waves burst over them. There was nothing else they could do.

"It is no place for a poor old fat man," snuffled Van Rijn. The gale ripped the words from him and flung them tattered over the rising seas. His shoulder-length curls flapped like forlorn pennons. "Better I should have stayed at home in Java where it is warm, not lost my last few pitiful years out here."

Wace strained his eyes into the gloom. The dugout had come near. Even a landlubber like himself could appreciate the skill of its crew, and Van Rijn was loud in his praises. "I nominate him for the Sunda Yacht Club, by damn, yes, and enter him in the next regatta and make bets!"

It was a big craft, more than thirty meters long, with an elaborate stempost, but dwarfed by the reckless spread of its blue-dyed sails. Outrigger or no, Wace expected it to capsize any moment. Of course, a flying species had less to worry about if that should happen than—

"The Diomedeans." Sandra's tone was quiet in his ear, under shrill wind and booming waters. "You have dealt with them for a year and a half, not? What can we await for from them?"

Wace shrugged. "What could we expect from any random tribe of humans, back in the Stone Age? They might be poets, or cannibals, or both. All I know is the Tyrlanian Flock, who are migratory hunters. They always stick by the letter of their law —not quite so scrupulous about its spirit, of course, but on the whole a decent tribe."

"You speak their language?"

"As well as my human palate and Techno-Terrestrial culture permit me to, my lady. I don't pretend to understand all their concepts, but we get along—" The broken hull lurched. He heard some abused wall rend, and the inward pouring of still more sea, and felt the sluggishness grow beneath his feet. Sandra stumbled against him. He saw that the spray was freezing in her brows.

"That does not mean I'll understand the local language," he finished. "We're farther from Tyrlan than Europe from China."

The canoe was almost on them now. None too soon: the wreck was due to dive any minute. It came about, the sails rattled down, a sea anchor was thrown and brawny arms dug paddles into the water. Swiftly, then, a Diomedean flapped over with a rope. Two others hovered close, obviously as guards. The first one landed and stared at the humans.

Tyrlan being farther north, its inhabitants had not yet returned from the tropics and this was the first Diomedean Sandra had encountered. She was too wet, cold, and weary to enjoy the unhuman grace of his movements, but she looked very close. She might have to dwell with this race a long time, if they did not murder her.

He was the size of a smallish man, plus a thick meter-long tail ending in a fleshy rudder and the tremendous chiropteral wings folded along his back. His arms were set below the wings, near the middle of a sleek otterlike body, and looked startlingly human, down to the muscular five-fingered hands. The legs were less familiar, bending backward from four-taloned feet which might almost have belonged to some bird of prey. The head, at the end of a neck that would have been twice too long on a human, was round, with a high forehead, yellow eyes with nictitating membranes under heavy brow ridges, a blunt-muzzled black-nosed face with short cat-whiskers, a big mouth and the bearlike teeth of a flesh-eater turned omnivore. There were no external ears, but a crest of muscle on the head helped control flight. Short, soft brown fur covered him; he was plainly a male mammal.

He wore two belts looped around his "shoulders," a third about his waist, and a pair of bulging leather pouches. An obsidian knife, a slender flint-headed ax, and a set of bolas were hung in plain view. Through the thickening dusk, it was hard to make out what his wheeling comrades bore for weapons—something long and thin, but surely not a rifle, on this planet without copper or iron. . . .

Wace leaned forward and forced his tongue around the grunting syllables of Tyrlanian: "We are friends. Do you understand me?"

A string of totally foreign words snapped at him. He shrugged, ruefully, and spread his hands. The Diomedean moved across the hull—

bipedal, body slanted forward to balance wings and tail—and found the stud to which the humans' lashings were anchored. Quickly, he knotted his own rope to the same place.

"A square knot," said Van Rijn, almost quietly. "It makes me homesick."

At the other end of the line, they began to haul the canoe closer. The Diomedean turned to Wace and pointed at his vessel. Wace nodded, realized that the gesture was probably meaningless here, and took a precarious step in that direction. The Diomedean caught another rope flung to him. He pointed at it, and at the humans, and made gestures.

"I understand," said Van Rijn. "Nearer than this they dare not come. Too easy their boat gets smashed against us. We get this cord tied around our bodies, and they haul us across. Good St. Christopher, what a thing to do to a poor creaky-boned old man!"

"There's our food, though," said Wace.

The skycruiser jerked and settled deeper. The Diomedean jittered nervously.

"No, no!" shouted Van Rijn. He seemed under the impression that if he only bellowed loudly enough, he could penetrate the linguistic barrier. His arms windmilled. "*Nie!* Never! Do you not understand, you oatmeal brains? Better to guggle down in your pest-begotten ocean than try eating your food. We die! Bellyache! Suicide!" He pointed at his mouth, slapped his abdomen, and waved at the rations.

Wace reflected grimly that evolution was too flexible. Here you had a planet with oxygen, nitrogen, hydrogen, carbon, sulfur . . . a protein biochemistry forming genes, chromosomes, cells, tissues . . . protoplasm by any reasonable definition . . . and the human who tried to eat a fruit or steak from Diomedes would be dead ten minutes later of about fifty lethal allergic reactions. These just weren't the *right* proteins. In fact, only immunization shots prevented men from getting chronic hay fever, asthma, and hives, merely from the air they breathed or the water they drank.

He had spent many cold hours today piling the cruiser's food supplies out here, for transference to the raft. This luxury atmospheric vessel had been carried in Van Rijn's spaceship, ready-stocked for extended picnic orgies when the mood struck him. There was enough rye bread, sweet butter, Edam cheese, lox, smoked turkey, dill pickles, fruit preserves, chocolate, plum pudding, beer, wine, and God knew what else, to keep three people going for a few months.

The Diomedean spread his wings, flapping them to maintain his footing. In the wan stormy light, the thumbs-turned-claws on their leading edge seemed to whicker past Van Rijn's beaky face like a mowing machine operated by some modernistic Death. The merchant waited stolidly, now and then aiming a finger at the stacked cases. Finally the Diomedean got the idea, or simply gave in. There was scant time left. He whistled across to the canoe. A swarm of his fellows came over, undid the lashings and began transporting boxes. Wace helped Sandra fasten the rope about her. "I'm afraid it will be a wet haul, my lady," he tried to smile.

She sneezed. "So this is the brave pioneering between the stars! I will have a word or two for my court poets when I get home . . . if I do."

When she was across, and the rope had been flown back, Van Rijn waved Wace ahead. He himself was arguing with the Diomedean chief. How it was done without a word of real language between them, Wace did not know, but they had reached the stage of screaming indignation at each other. Just as Wace set his teeth and went overboard, Van Rijn sat mutinously down.

And when the younger man made his drowned-rat arrival on board the canoe, the merchant had evidently won his point. A Diomedean could air-lift about fifty kilos for short distances. Three of them improvised a rope sling and carried Van Rijn over, above the water.

He had not yet reached the canoe when the skycruiser sank.

IV

The dugout held some hundred natives, all armed, some wearing helmets and breastplates of hard laminated leather. A catapult, just visible through the dark, was mounted at the bows; the stern held a cabin, made from sapling trunks chinked with sea weed, that towered up almost like the rear end of a medieval caravel. On its roof, two helmsmen strained at the long tiller.

"Plain to see, we have found a navy ship," grunted Van Rijn. "Not so good, that. With a trader, I can talk. With some pest-and-pox officer with gold braids on his brain, him I can only shout." He raised small, close-set gray eyes to a night heaven where lightning ramped. "I am a poor old sinner," he shouted, "but this I have not deserved! Do you hear me?"

After a while the humans were prodded between lithe devil-bodies, toward the cabin. The dugout had begun to run before the gale, on two reef points and a jib. The roll and pitch, clamor of waves and wind and thunder, had receded into the back of Wace's consciousness. He wanted only to find some place that was dry, take off his clothes and crawl into bed and sleep for a hundred years.

The cabin was small. Three humans and two Diomedeans left barely room to sit down. But it was warm, and a stone lamp hung from the ceiling threw a dim light full of grotesquely moving shadows.

The native who had first met them was present. His volcanic-glass dagger lay unsheathed in one hand, and he held a wary lion-crouch; but half his attention seemed aimed at the other one, who was leaner and older, with flecks of gray in the fur, and who was tied to a corner post by a rawhide leash.

Sandra's eyes narrowed. The blaster which Van Rijn had lent her slid quietly to her lap as she sat down. The Diomedean with the knife flicked his gaze across it, and Van Rijn swore. "You little all-thumbs brain, do you let him see what is a weapon?"

The first autochthone said something to the leashed one. The latter made a reply with a growl in it, then turned to the humans. When he spoke, it did not sound like the same language.

"So! An interpreter!" said Van Rijn. "You speakee Angly, ha? Haw, haw, haw!" He slapped his thigh.

"No, wait. It's worth trying." Wace dropped into Tyrlanian: "Do you understand me? This is the only speech we could possibly have in common."

The captive raised his head-crest and sat up on hands and haunches. What he answered was *almost* familiar. "Speak slowly, if you will," said Wace, and felt sleepiness drain out of him.

Meaning came through, thickly: "You do not use a version (?) of the Carnoi that I have heard before."

"Carnoi—" Wait, yes, one of the Tyrlanians had mentioned a confederation of tribes far to the south, bearing some such name. "I am using the tongue of the folk of Tyrlan."

"I know not that race (?). They do not winter in our grounds. Nor do any Carnoi as a regular (?) thing, but now and then when all are in the tropics (?) one of them happens by, so—" It faded into unintelligibility.

The Diomedean with the knife said something, impatiently, and got a curt answer. The interpreter said to Wace:

"I am Tolk, a *mochra* of the Lannachska—"

"A what of the what?" said Wace.

It is not easy even for two humans to converse, when it must be in different patois of a language foreign to both. The dense accents imposed by human vocal cords and Diomedean ears—they heard farther into the subsonic, but did not go quite so high in pitch, and the curve of maximum response was different—made it a slow and painful process indeed. Wace took an hour to get a few sentences' worth of information.

Tolk was a linguistic specialist of the Great Flock of Lannach; it was his function to learn every language that came to his tribe's attention, which were many. His title might, perhaps, be rendered Herald, for his duties included a good deal of ceremonial announcements and he presided over a corps of messengers. The Flock was at war with the Drak'honai, and Tolk had been captured in a recent skirmish. The other Diomedean present was named Delp, and was a high-ranking officer of the Drak'honai.

Wace postponed saying much about himself, less from a wish to be secretive than from a realization of how appalling a task it would be. He did ask Tolk to warn Delp that the food from the cruiser, while essential to Earthlings, would kill a Diomedean.

"And why should I tell him that?" asked Tolk, with a grin that was quite humanly unpleasant.

"If you don't," said Wace, "it may go hard with you when he learns that you did not."

"True." Tolk spoke to Delp. The officer made a quick response.

"He says you will not be harmed unless you yourselves make it necessary," explained Tolk. "He says you are to learn his language so he can talk with you himself."

"What was it now?" interrupted Van Rijn.

Wace told him. Van Rijn exploded. "What? What does he say? Stay here till— Death and wet liver! I tell that filthy toad—" He half rose to his feet. Delp's wings rattled together. His teeth showed. The door was flung open and a pair of guards looked in. One of them carried a tomahawk, another had a wooden rake set with chips of flint.

Van Rijn clapped a hand to his gun. Delp's voice crackled out. Tolk translated: "He says to be calm."

After more parley, and with considerable effort and guesswork on Wace's part: "He wishes you no harm, but he must think of his own people. You are something new. Perhaps you can help him, or perhaps you are so harmful that he dare not let you go. He must have time to find out. You will remove all your garments and implements, and leave them in his charge. You will be provided other clothing, since it appears you have no fur."

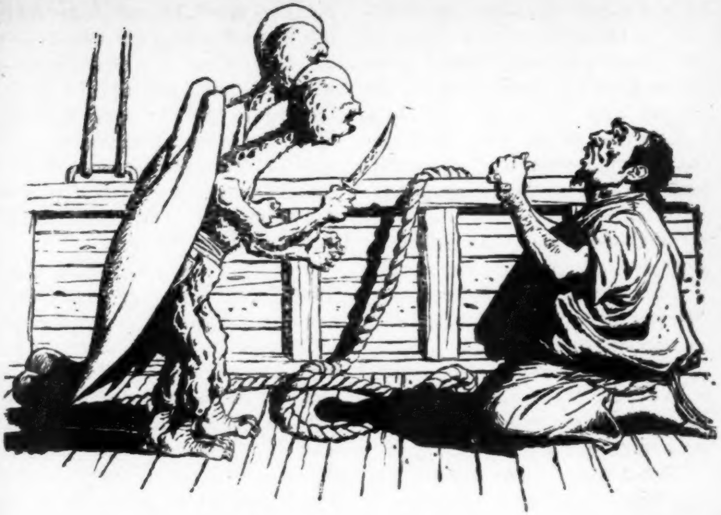
When Wace had interpreted for Van Rijn, the merchant said, surprisingly at ease: "I think we have no choice just now. We can burn down many of them, *ja*. Maybe we can take the whole boat. But we cannot sail it all the way home by ourselves. If nothing else, we would starve en route, *nie?* Were I younger, yes, by good St. George, I would fight on general principles. Singlehanded I would take him apart and play a xylophone on his ribs, and try to bluster his whole nation into helping me. But now I am too old and fat and tired. It is hard to be old, my boy—"

He wrinkled his sloping forehead and nodded in a wise fashion. "But, where there are enemies to bid against each other, that is where an honest trader has a chance to make a little bit profit!"

V

"First," said Wace, "you must understand that the world is shaped like a ball."

"Our philosophers have known it for a long time," said Delp complacently. "Even barbarians like the Lannach'honai have an idea of the truth. After all, they cover thousands of obdisai every year, migrating. We're not so mobile, but we had to work out an astronomy before we could navigate very far."



Wace doubted that the Drak'honai could locate themselves with great precision. It was astonishing what their neolithic technology had achieved, not only in stone but in glass and ceramics; they even molded a few synthetic resins. They had telescopes, a sort of astrolabe, and navigational tables based on sun, stars, and the two small moons. However, compass and chronometer require iron, which simply did not exist in any noticeable quantity on Diomedes.

Automatically, he noted a rich potential market. The primitive Tyrlanians were avid for simple tools and weapons of metal, paying exorbitantly in the furs, gems, and pharmaceutically useful juices which made this planet worth the attention of the Polesotechnic League. The Drak'honai could use more sophisticated amenities, from clocks and slide rules to Diesel engines—and were able to meet proportionately higher prices.

He recollected where he was: the raft *Gerunis,* headquarters of the Chief Executive Officer of the Fleet; and that the amiable creature who sat on the upper deck and talked with him was actually his jailer.

How long had it been since the crash — fifteen Diomedean days? That would be more than a week, Terrestrial reckoning. Several per cent of the Earthside food was already eaten.

He had lashed himself into learning the Drak'ho tongue from his fellow-prisoner Tolk. It was fortunate that the League had, of necessity, long ago developed the principles by which instruction could be given in minimal time. When properly focused, a trained mind need only be told something once. Tolk himself used an almost identical system; he might never have seen metal, but the Herald was semantically sophisticated.

"Well, then," said Wace, still haltingly and with gaps in his vocabulary, but adequately for his purposes, "do you know that this world-ball goes around the sun?"

"Quite a few of the philosophers believe that," said Delp. "I'm a practical (?) one myself, and never cared much one way or another."

"The motion of your world is unusual. In fact, in many ways this is a freak place. Your sun is cooler and redder than ours, so your home is colder. This sun has a *mass* . . . what do you say? . . . oh, call it a weight . . . not much less than that of our own; and it is about the same distance. Therefore Diomedes, as we call your world, has a year only somewhat longer than our Earth's. Seven hundred eighty-two Diomedean days, isn't it? Diomedes has more than twice the diameter of Earth, but lacks the heavy materials found in most worlds. Therefore its *gravity*—hell! —therefore I only weigh about one-tenth more here than I would at home."

"I don't understand," said Delp.

"Oh, never mind," said Wace gloomily.

The planetographers were still puzzling about Diomedes. It didn't fall into either of the standard types, the small hard ball like Earth or Mars, or the gas giant with a collapsed core like Jupiter or 61 Cygni C. It was intermediate, with a mass of 4.75 Earths; but its overall density was only half as much. This was due to the nearly total absence of all elements beyond calcium.

There was one sister freak, uninhabitable; the remaining planets were more or less normal giants, the sun a G8 dwarf not very different from other stars of that size and temperature. It was theorized that because of some improbable turbulence, or possibly an odd magnetic effect—a chance-created cosmic mass spectrograph—there had been no heavy elements in the local section of the primordial gas cloud. . . . But why hadn't there at least been a density-increasing molecular collapse at the center of Diomedes? Sheer mass-pressure ought to have produced degeneracy. The most plausible answer to that was, the minerals in the body of this world were not normal ones, being formed in the absence of such elements as chromium, manganese, iron, and nickel. Their crystal structure was apparently more stable than, say, olivine, the most important of the Earth materials condensed by pressure—

The devil with it!

"Never mind that weight stuff," said Delp. "What's so unusual about the motion of Ikt-hanis?" It was his name for this planet, and did not mean "earth" but—in a language where nouns were compared—could be translated "Oceanest," and was feminine.

Wace needed time to reply; the technicalities outran his vocabulary.

It was merely that the axial tilt of Diomedes was almost ninety degrees, so that the poles were virtually in the ecliptic plane. But that fact, coupled with the cool ultra-violet-poor sun, had set the pattern of life.

At either pole, nearly half the year was spent in total night. The endless daylight of the other half did not really compensate; there were polar species, but they were unimpressive hibernators. Even at forty-five degrees latitude, a fourth of the year was darkness, in a winter grimmer than Earth had ever seen. That was as far north or south as any intelligent Diomedeans could live; the annual migration used up too much of their time and energy, and they fell into a stagnant struggle for existence on the paleolithic level.

Here, at thirty degrees north, the Absolute Winter lasted one-sixth of the year—a shade over two Terrestrial months—and it was only (!) a few weeks' flight to the equatorial breeding grounds and back during that time. Therefore the Lannachska were a fairly cultivated people. The Drak'honai were originally from even farther south—

But you could only do so much without metals. Of course, Diomedes had abundant magnesium, beryllium, and aluminum, but what use was that unless you first developed electrolytic technology, which required copper or silver?

Delp cocked his head. "You mean it's always equinox on your Eart'?"

"Well, not quite. But by your standards, very nearly!"

"So that's why you haven't got wings. The Lodestar didn't give you any, because you don't need them."

"Uh . . . perhaps. They'd have been no use to us, anyway. Earth's air is too thin for a creature the size of you or me to fly under its own power."

"What do you mean, thin? Air is . . . is air."

"Oh, never mind. Take my word for it."

How did you explain gravitational potential to a nonhuman whose mathematics was about on Euclid's level? You could say: "Look, if you go sixty-three hundred kilometers upward from the surface of Earth, the attraction has dropped off to one-fourth; but you must go thirteen thousand kilometers upward from Diomedes to diminish its pull on you correspondingly. Therefore Diomedes can hold a great deal more air. The weaker solar radiation helps, to be sure, especially the relatively less ultraviolet. But on the whole, gravitational potential is the secret.

"In fact, so dense is this air that if it held proportionate amounts of oxygen, or even of nitrogen, it would poison me. Luckily, the Diomedean atmosphere is a full seventy-nine per cent neon. Oxygen and nitrogen are lesser constituents: their partial pressures do not amount to very much more than on Earth. Likewise carbon dioxide and water vapor."

But Wace said only: "Let's talk about ourselves. Do you understand that the stars are other suns, like yours, but immensely farther away; and that Earth is a world of such a star?"

"Yes. I've heard the philosophers wonder—I'll believe you."

"Do you realize what our powers are, to cross the space between the stars? Do you know how we can reward you for your help in getting us home, and how our friends can punish you if you keep us here?"

For just a moment, Delp spread his wings, the fur bristled along his back and his eyes became flat yellow chips. He belonged to a proud folk.

Then he slumped. Across all gulfs of race, the human could sense how troubled he was:

"You told me yourself, Eart'ho, that you crossed The Ocean from the west, and in thousands of obdisai you didn't see so much as an island. It bears our own explorings out. We couldn't possibly fly that far, carrying you or just a message to your friends, without some place to stop and rest between times."

Wace nodded, slowly and carefully. "I see. And you couldn't take us back in a fast canoe before our food runs out."

"I'm afraid not. Even with favoring winds all the way, a boat is so much slower than wings. It'd take us half a year or more to sail the distance you speak of."

"But there must be *some* way—"

"Perhaps. But we're fighting a hard war, remember. We can't spare much effort or many workers for your sake.

"I don't think the Admiralty even intends to try."

VI

To the south was Lannach, an island the size of Britain. From it Holmenach, an archipelago, curved northward for some hundreds of kilometers, into regions still wintry. Thus the islands acted as boundary and shield: defining the Sea of Achan, protecting it from the great cold currents of The Ocean.

Here the Drak'honai lay.

Nicholas van Rijn stood on the main deck of the *Gerunis,* glaring eastward to the Fleet's main body. The roughly woven, roughly fitted coat and trousers which a Sailmaker had thrown together for him irritated a skin long used to more expensive fabrics. He was tired of sugar-cured ham and brandied peaches—though when such fare gave out, he would begin starving to death. The thought of being a captured chattel whose wishes nobody need consult was pure anguish. The reflection on how much money the company must be losing for lack of his personal supervision was almost as bad.

"Bah!" he rumbled. "If they would make it a goal of their policy to get us home, it could be done."

Sandra gave him a weary look.

"And what shall the Lannachs be doing while the Drak'honai bend all their efforts to return us?" she answered. "It is still a close thing, this war of theirs. Dra'ho could lose it yet."

"Satan's hoof-and-mouth disease!" He waved a hairy fist in the air. "While they squabble about their stupid little territories, the Solar Spice & Liquors is losing a million credits a day!"

"The war happens to be a life-and-death matter for both sides," she said.

"Also for us. *Nie?*" He fumbled after a pipe, remembered that his meerschaums were on the sea bottom, and groaned. "When I find who it was stuck that bomb in my cruiser—" It did not occur to him to offer excuses for getting her into this. But then, perhaps it was she who had indirectly caused the trouble. "Well," he finished on a calmer note, "it is true we must settle matters here, I think. End the war for them so they can do important business like getting me home."

Sandra frowned across the bright sun-blink of waters. "Do you mean help the Drak-honai? I do not care for that so much. They are the aggressors. But then, they saw the wives and little ones hungry—" She sighed. "It is hard to unravel. Let such be so, then."

"Oh, no!" Van Rijn combed his goatee. "We help the other side. The Lannachska."

"What!" She stood back from the rail and dropped her jaw at him. "But . . . but—"

"You see," explained Van Rijn, "I know a little something about politics. It is needful for an honest businessman seeking to make him a little hard-earned profit, else some louse-bound politician comes and taxes it from him for some idiot school or old-age pension. The politics here is not so different from what we do out in the galaxy. It is a culture of powerful aristocrats, this Fleet, but the balance of power lies with the throne—the Admiralty. Now the admiral is old, and his son the crown prince has more to say than is rightful. I waggle my ears at gossip—they forget how much better we hear than they, in this pea-soup-with-sausages atmosphere. I know. He is a hard-cooked one, him that T'heonax.

"So we help the Drak'honai win over the Flock. So what? They are already winning. The Flock is only making guerrilla now, in the wild parts of Lannach. They are still powerful, but the Fleet has the upper hand, and need only maintain *status quo* to win. Anyhow, what can we, who the good God did not offer wings, do at guerrillas? We show T'heonax how to use a blaster, well, how do we show him how to find somebodies to use it on?"

"Hm-m-m . . . yes." She nodded, stiffly. "You mean that we have nothing to offer the Drak'honai, except trade and treaty later on, if they get us home."

"Just so. And what hurry is there

for them to meet the League? They are natural wary of unknowns like us from Earth. They like better to consolidate themselves in their new conquest before taking on powerful strangers, *nie?* I hear the scuttled butt, I tell you; I know the trend of thought about us. Maybe T'heonax lets us starve, or cuts our throats. Maybe he throws our stuff overboard and says later he never heard of us. Or maybe, when a League boat finds him at last, he says *ja,* we pulled some humans from the sea, and we was good to them, but we could not get them home in time."

"But could they—actually? I mean, Freeman van Rijn, how would *you* get us home, with any kind of Diomedean help?"

"Bah! Details! I am not an engineer. Engineers I hire. My job is not to do what is impossible, it is to make others do it for me. Only how can I organize things when I am only a more-than-half prisoner of a king who is not interested in meeting my peoples? Hah?"

"Whereas the Lannach tribe is hard pressed and will let you, what they say, write your own ticket. Yes." Sandra laughed, with a touch of genuine humor. "Very good, my friend! Only one question now, how do we get to the Lannachs?"

She waved a hand at their surroundings. It was not an encouraging view.

The *Gerunis* was a typical raft: a big structure, of light tough balsalike logs lashed together with enough open space and flexibility to yield before the sea. A wall of uprights, pegged to the transverse logs, defined a capacious hold and supported a main deck of painfully trimmed planks. Poop and forecastle rose at either end, their flat roofs bearing artillery and, in the former case, the outsize tiller. Between them were seaweed-thatched cabins for storage, workshops, and living quarters. The overall dimensions were about sixty meters by fifteen, tapering toward a false bow which provided a catapult platform and some streamlining. A foremast and mainmast each carried three big square sails, a lateen-rigged mizzen stood just forward of the poop. Given a favoring wind—remembering the force of most winds on this planet—the seemingly awkward craft could make several knots, and even in a dead calm it could be rowed.

It held about a hundred Diomedeans plus wives and children. Of those, ten couples were aristocrats, with private apartments in the poop; twenty were ranking sailors, with special skills, entitled to one room per family in the main-deck cabins; the rest were common deckhands, barracked into the forecastle.

Not far away floated the rest of this squadron. There were rafts of various types, some primarily dwelling units like the *Gerunis,* some triple-decked for cargo, some bearing the long sheds in which fish and seaweed were processed. Often several at a time were linked together, to form a little temporary island.

Moored to them, or patrolling between, were the outrigger canoes. Wings beat in the sky, where aerial detachments kept watch for an enemy: full-time professional warriors, the core of Drak'ho's military strength.

Beyond this outlying squadron, the other divisions of the Fleet darkened the water as far as a man's eyes would reach. Most of them were fishing. It was brutally hard work, where long nets were trolled by muscle power. Nearly all a Drak'ho's life seemed to go to back-bending labor. But out of these fluid fields they were dragging a harvest which leaped and flashed.

"Like fiends they must drive themselves," observed Van Rijn. He slapped the stout rail. "This is tough wood, even when green, and they chew it smooth with stone and glass tools! Some of these fellows I would like to hire, if the union busybodies can be kept away from them."

Sandra stamped her foot. She had not complained at danger of death, cold and discomfort and the drudgery of Tolk's language lessons filtered through Wace. But there are limits. "Either you talk sense, Freeman, or I go somewhere else! I asked you how we get away from here."

"We get rescued by the Lannachska, of course," said Van Rijn. "Or, rather, they come steal us. Yes, sofashion will be better. Then, if they fail, friend Delp cannot say it is our fault we are so desired by all parties."

Her tall form grew rigid. "What do you mean? How are they to know we are even here?"

"Maybe Tolk will tell them."

"But Tolk is even more a prisoner than we, not?"

"So. However—" Van Rijn rubbed his hands. "We have a little plan made. He is a good head, him. Almost as good as me."

Sandra glared. "And will you deign to tell me how you plotted with Tolk, under enemy surveillance, when you cannot even speak Drak'ho?"

"Oh, I speak Drak'ho pretty good," said Van Rijn blandly. "Did you not just hear me admit how I eavesdrop on all the palaver aboard? You think just because I make so much trouble, and still sit hours every day taking special instruction from Tolk, it is because I am a dumb old bell who cannot learn so easy? Horse maneuvers! Half the time we mumble together, he is teaching me his own Lannach lingo. Nobody on this raft knows it, so when they hear us say funny noises they think maybe Tolk tries words of Earth language out, ha? They think he despairs of teaching me through Wace and tries himself to pound some Drak'ho in me. Ho, ho, they are bamboozles, by damn! Why, yesterday I told Tolk a dirty joke in Lannachamael. He looked very disgusted. There is proof that poor old Van Rijn is not fat between the ears. We say nothing of the rest of his anatomy."

Sandra stood quiet for a bit, trying to understand what it meant to

learn two nonhuman languages simultaneously, one of them forbidden.

"I do not see why Tolk looks disgusted," mused Van Rijn. "It was a good joke. Listen: there was a salesman who traveled on one of the colonial planets, and—"

"I can guess why," interrupted Sandra hastily. "I mean . . . why Tolk did not think it was a funny tale. Er . . . Freeman Wace was explaining it to me the other day. Here on Diomedes they have not the trait of, um, constant sexuality. They breed once each year only, in the tropics. No families in our sense. They would not think our"—she blushed—"our all-year-around interest in these questions was very normal or very polite."

Van Rijn nodded. "All this I know. But Tolk has seen somewhat of the Fleet, and in the Fleet they do have marriage, and get born at any time of year, just like humans."

"I got that impression," she answered slowly, "and it puzzles me. Freeman Wace said the breeding cycle was in their, their heredity. Instinct, or glands, or what it now is called. How *could* the Fleet live differently from what their glands dictate?"

"Well, they do." Van Rijn shrugged massive shoulders. "Maybe we let some scientist worry about it for a thesis later on, hah?"

Suddenly she gripped his arm so he winced. Her eyes were a green blaze. "But you have not said . . . what is to happen? How is Tolk to get word about us to Lannach? What do we do?"

"I have no idea," he told her cheerily. "I play with the ear."

He cocked a beady eye at the pale reddish overcast. Several kilometers away, enormously timbered, bearing what was almost a wooden castle, floated the flagship of all Drak'ho. A swirl of bat wings was lifting from it and streaming toward the *Gerunis*. Faintly down the sky was borne the screech of a blown sea shell.

"But I think maybe we find out quick," finished Van Rijn, "because his rheumatic majesty comes here now to decide about us."

VII

The admiral's household troops, a hundred full-time warriors, landed with beautiful exactness and snapped their weapons to position. Polished stone and oiled leather caught the dull light like sea-blink; the wind of their wings roared across the deck. A purple banner trimmed with scarlet shook loose, and the *Gerunis* crew, respectfully crowded into the rigging and on the forecastle roof, let out a hoarse ritual cheer.

Delp hyr Orikan advanced from the poop and crouched before his lord. His wife, the beautiful Rodonis sa Axollon, and his two young children came behind him, bellies to the deck and wings over eyes. All wore the scarlet sashes and jeweled armbands which were formal dress.

The three humans stood beside Delp. Van Rijn had vetoed any suggestion that they crouch, too. "It is not right for a member of the Polesotechnic League, he should get down on knees and elbows. Anyway I am not built for it."

Tolk of Lannach sat haughty next to Van Rijn. His wings were tucked into a net and the leash on his neck was held by a husky sailor. His eyes were as bleak and steady on the admiral as a snake's.

And the armed young males who formed a rough honor guard for Delp their captain had something of the same chill in their manner—not toward Syranax, but toward his son, the heir apparent on whom the admiral leaned. Their spears, rakes, tomahawks, and wood-bayoneted blowguns were held in a gesture of total respect: nevertheless, the weapons were held.

Wace thought that Van Rijn's outsize nose must have an abnormal keenness for discord. Only now did he himself sense the tension on which his boss had obviously been counting.

Syranax cleared his throat, blinked, and pointed his muzzle at the humans. "Which one of you is captain?" he asked. It was still a deep voice, but it no longer came from the bottom of the lungs, and there was a mucous rattle in it.

Wace stepped forward. His answer was the one Van Rijn had, hastily and without bothering to explain, commanded that he give: "The other male is our leader, sir. But he does not speak your language very well as yet. I myself still have trouble with it, so we must use this Lannach'ho prisoner to interpret."

T'heonax scowled. "How should he know what you want to say to us?"

"He has been teaching us your language," said Wace. "As you know, sir, foreign tongues are his main task in life. Because of this natural ability, as well as his special experience with us, he will often be able to guess what we may be trying to say when we search for a word."

"That sounds reasonable." Syranax's gray head wove about. "Yes."

"I wonder!" T'heonax gave Delp an ugly look. It was returned in spades.

"So! By damn, now I talk." Van Rijn rolled forward. "My good friend . . . um . . . er . . . *pokker,* what is the word?—my admiral, we, ahem, we talk-um like good brothers —good brothers, is that how I say-um, Tolk?—"

Wace winced. Despite what Sandra had whispered to him, as they were being hustled here to receive the visitors, he found it hard to believe that so ludicrous an accent and grammar were faked.

And why?

Syranax stirred impatiently. "It may be best if we talked through your companion," he suggested.

"Bilge and barnacles!" shouted Van Rijn. "Him? No, no, me talk-um talky-talk self. Straight, like, um, er, what-is-your-title. We talk-um like brothers, ha?"

Syranax sighed. But it did not occur to him to overrule the human. An alien aristocrat was still an aristocrat, in the eyes of this caste-ridden society, and as such might surely claim the right to speak for himself.

"I would have visited you before," said the admiral, "but you could not have conversed with me, and there was so much else to do. As they grow more desperate, the Lannach'honai become more dangerous in their raids and ambushes. Not a day goes by that we do not have at least a minor battle."

"Hm-m-m?" Van Rijn counted off the declension-comparison on his fingers. "*Xammagapai* . . . let me see, *xammagan, xammagai* . . . oh, yes. A small fight! I make-um see no fights, old admiral—I mean, honored admiral."

T'heonax bristled. "Watch your tongue, Eart'ho!" he clipped. He had been over frequently to stare at the prisoners, and their sequestered possessions were in his keeping. Little awe remained—but then, Wace decided, T'heonax was not capable of admitting that a being could possibly exist in any way superior to T'heonax.

"And yours, son," murmured Syranax. To Van Rijn: "Oh, they would scarcely venture this far out. I mean our positions on the mainland are constantly harassed."

"Yes," nodded the Terrestrial, rather blankly.

Syranax lay down on the deck in an easy lion-pose. T'heonax remained standing, taut in Delp's presence. "I have, of course, been getting reports about you," went on the admiral. "They are, ah, remarkable. Yes, remarkable. It's alleged you came from the stars."

"Stars, yes!" Van Rijn's head bobbed with imbecilic eagerness. "We from stars. Far far away."

"Is it true also that your people have established an outpost on the other shore of The Ocean?"

Van Rijn went into a huddle with Tolk. The Lannacha put the question into childish words. After several explanations, Van Rijn beamed. "Yes, yes, we from across Ocean. Far far away."

"Will your friends not come in search of you?"

"They look-um, yes, they look-um plenty hard. By Joe! Look-um all over. You treat-um us good or our friends find out and—" Van Rijn broke off, looking dismayed, and conferred again with Tolk.

"I believe the Eart'ho wishes to apologize for tactlessness," explained the Herald dryly.

"It may be a truthful kind of tactlessness," observed Syranax. "If his friends can, indeed, locate him while he is still alive, much will depend on what kind of treatment he received from us. Eh? The problem is, can they find him that soon? What say, Eart'ho?" He pushed the last question out like a spear.

Van Rijn retreated, lifting his hands as if to ward off a blow. "Help!" he whined. "You help-um us, take us home, old admiral . . . honored admiral . . . we go home and pay-um many many fish."

T'heonax murmured in his father's ear: "The truth comes out—not that I haven't suspected as much already. His friends have no measurable chance of finding him before he starves. If they did, he wouldn't be begging us for help. He'd be demanding whatever struck his fancy."

"*I* would have done that in all events," said the admiral. "Our friend isn't very experienced in these matters, eh? Well, it's good to know how easily truth can be squeezed out of him."

"So," said T'heonax contemptuously, not bothering to whisper, "the only problem is, to get some value out of the beasts before they die."

Sandra's breath sucked sharply in. Wace grasped her arm, opened his mouth, and caught Van Rijn's hurried Anglic murmur: "Shut up! Not a word, you bucket head!" Whereupon the merchant resumed his timid smile and attitude of straining puzzlement.

"It isn't right!" exploded Delp. "By the Lodestar, sir, these are guests—not enemies—we can't just *use* them!"

"What else would you do?" shrugged T'heonax.

His father blinked and mumbled, as if weighing the arguments for both sides. Something like a spark jumped between Delp and T'heonax. It ran along the ranked lines of *Gerunis* crew-folk and household troopers as an imperceptible tautening, the barest ripple of muscle and forward slant of weapons.

Van Rijn seemed to get the drift all at once. He recoiled operatically, covered his eyes, then went to his knees before Delp. "No, no!" he screamed. "You take-um us home! You help-um us, we help-um you! You remember say how you help-um us if we help-um you!"

"What's this?"

It was a wild-animal snarl from T'heonax. He surged forward. "You've been bargaining with them, have you?"

"What do you mean?" The executive's teeth clashed together, centimeters from T'heonax's nose. His wing-spurs lifted like knives.

"What sort of help were these creatures going to give you?"

"What do you think?" Delp flung the gage into the winds, and crouched waiting.

T'heonax did not quite pick it up. "Some might guess you had ideas of getting rid of certain rivals within the Fleet," he purred.

In the silence which fell across the raft, Wace could hear how the dragon shapes up in the rigging breathed more swiftly. He could hear the creak of timbers and cables, the slap of waves and the low damp mumble of wind. Almost, he heard obsidian daggers being loosened in their sheaths.

If an unpopular prince finds an excuse to arrest a subordinate whom the commoners trust, there are likely going to be men who will fight. It was not otherwise here on Diomedes.

Syranax broke the explosive quiet. "There's some kind of misunderstanding," he said loudly. "Nobody is going to charge anyone with anything on the basis of this wingless creature's gabble. What's the fuss about? What could he possibly do for any of us, anyway?"

"That remains to be seen," answered T'heonax. "But a race which can fly across The Ocean in less than an equinoctial day must know some handy arts."

He whirled on a quivering Van Rijn. With the relish of the inquisitor whose suspect has broken, he said curtly: "Maybe we can get you home somehow if you help us. We are not sure how to get you home. Maybe your stuff can help us get you home. You show us how to use your stuff."

"Oh, yes!" said Van Rijn. He clasped his hands and waggled his head. "Oh, yes, good sir, I do you want-um."

T'heonax clipped an order. A Drak'ho slithered across the deck with a large box. "I've been in charge of these things," explained the heir. "Haven't tried to fool with it, except for a few knives of that shimmery substance—" Momentarily, his eyes glowed with honest enthusiasm. "You've never *seen* such knives, father! They don't hack or grind, they slice! They'll carve seasoned wood!"

He opened the box. The ranking officers forgot dignity and crowded around. T'heonax waved them back. "Give this blubberpot room to demonstrate," he snapped. "Bowmen, blowgunners, cover him from all sides. Be ready to shoot if necessary."

Van Rijn took out a blaster.

"You mean to fight your way clear?" hissed Wace. "You can't!" He tried to step between Sandra and the menace of weapons which suddenly ringed them in. "They'll fill us with arrows before—"

"I know, I know," growled Van Rijn *sotto voce.* "When will you young pridesters learn, just because he is old and lonely, the boss does not yet have teredos in the brain? You keep back, boy, and when trouble breaks loose, hit the deck and dig a hole."

"What? But—"

Van Rijn turned a broad back on him and said in broken Drak'ho, with servile eagerness: "Here a . . . how you call it? . . . thing. It make fire. It burn-um holes, by Joe."

"A portable flame thrower—that small?" For a moment, an edge of terror sharpened T'heonax's voice.

"I told you," said Delp, "we can gain more by dealing honorably with them. By the Lodestar, I think we could get them home, too, if we really tried!"

"You might wait till I'm dead, Delp, before taking the Admiralty," said Syranax. If he meant it as a joke, it fell like a bomb. The nearer sailors, who heard it, gasped. The household warriors touched their bows and blowguns. Rodonis sa Axollno spread her wings over her children and snarled. Deckhand females, jammed into the forecastle, let out a whimper of half-comprehending fear.

Delp himself steadied matters. "Quiet!" he bawled. "Belay there! Calm down! By all the devils in the Rainy Stars, have these creatures driven us crazy?"

"See," chattered Van Rijn, "take *blaster* . . . we call-um *blaster* . . . pull-um here—"

The ion beam stabbed out and crashed into the mainmast. Van Rijn yanked it away at once, but it had already made a gouge centimeters deep in that tough wood. Its blue-white flame licked across the deck, whiffed a coiled cable into smoke, and took a section out of the rail, before he released the trigger.

The Drak'honai roared!

It was minutes before they had settled back into the shrouds or onto the decks; curiosity seekers from nearby craft still speckled the sky. However, they were technologically sophisticated in their way. They were excited rather than frightened.

"Let me see that!" T'heonax snatched at the gun.

"Wait. Wait, good sir, wait." Van Rijn snapped open the chamber, in a set of movements screened by his thick hands, and popped out the charge. "Make-um safe first. There."

T'heonax turned it over and over. "What a weapon!" he breathed. "What a *weapon*!"

Standing there in a frosty sweat, waiting for Van Rijn to spoon up whatever variety of hell he was cooking, Wace still managed to reflect that the Drak'honai were overestimating. Natural enough, of course. But a gun of this sort would only have a serious effect on ground-fighting tactics—and the old sharper was coolly disarming all the blasters anyway, no uninstructed Diomedean was going to get any value from them—

"I make safe," Van Rijn burbled. "One, two, three, four, five I make safe. . . . Four? Five? Six?" He began turning over the piled-up clothes, blankets, heaters, campstove, and other equipment. "Where other three blasters?"

"What other three?" T'heonax stared at him.

"We have six." Van Rijn counted carefully on his fingers. "*Ja,* six. I give-um all to good sir Delp here."

"WHAT?"

Delp leaped at the human, cursing. "That's a lie! There were only three, and you've got them there!"

"Help!" Van Rijn scuttled behind T'heonax. Delp's body clipped the admiral's son. Both Drak'honai went over in a whirl of wings and tails.

"He's plotting mutiny!" screamed T'heonax.

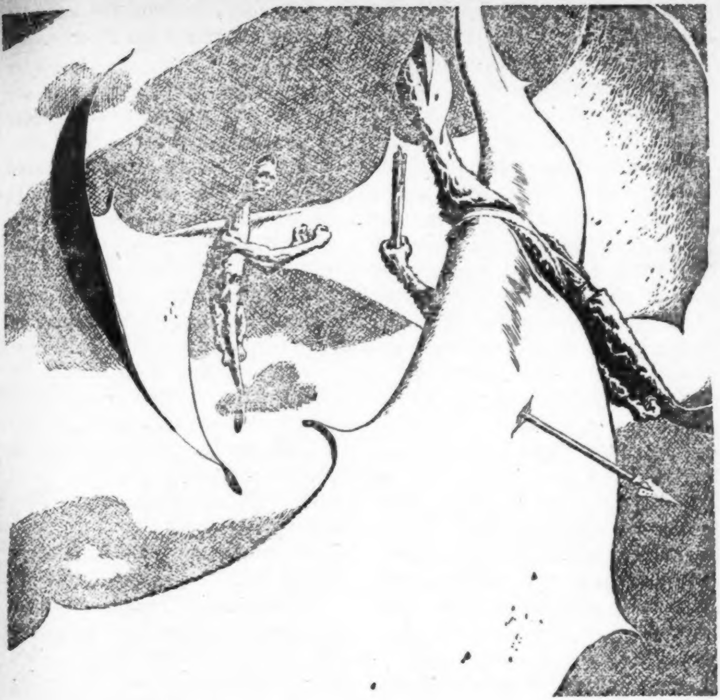
Wace threw Sandra to the deck and himself above her. The air grew dense with missiles.

Van Rijn turned ponderously to grab the sailor in charge of Tolk. But that Drak'ho had already sprung away to Delp's defense. Van Rijn had only to peel off the imprisoning net.

"Now," he said in fluent Lannachamael, "go bring an army to fetch us out of here. Quick, before someone notices!"

The Herald nodded, threshed his wings, and was gone into a sky where battle ran loose.

Van Rijn stooped over Wace and Sandra. "This way," he panted under the racket. A chance tail-buffet, as a sailor fought two troopers, brought a howl from him. "Thunder and lightning! Pest and poison ivy!" He wrestled Sandra to her feet and



hustled her toward the comparative shelter of the forecastle.

When they stood inside its door, among terrified females and cubs, looking out at the fight, he said:

"It is a pity that Delp will go under. He has no chance. He is a decent sort; we could maybe have done business."

"All saints in Heaven!" choked Wace. "You touched off a civil war just to get your messenger away?"

"You know perhaps a better method?" asked Van Rijn.

VIII

When Commander Krakna fell in battle against the invaders, the Flock's General Council picked one Trolwen to succeed him. They were the elders, and their choice comparatively youthful, but the Lannachska thought it only natural to be led by young males. A commander needed the physical stamina of two, to see them through a hard and dangerous migration every year; he seldom lived to grow feeble. Any rash impulses of his age were curbed by the General Council itself, the clan leaders who had grown too old to fly at the head of their squadron-septs and not yet so old and weak as to be left behind on some winter journey.

Trolwen's mother belonged to the Trekkhan group, a distinguished bloodline with rich properties on Lannach; she herself had added to that wealth by shrewd trading. She guessed that his father was Tornak of the Wendru—not that she cared especially, but Trolwen looked noticeably like that fierce warrior. However, it was his own record as a clan-elected officer, in storm and battle and negotiation and everyday routine, which caused the Council to pick him as leader of all the clans. In the ten-days since, he had been the chief of a losing cause; but possibly his folk were pressed back into the uplands more slowly than would have happened without him.

Now he led a major part of the Flock's fighting strength out against the Fleet itself.

Vernal equinox was barely past, but already the days lengthened with giant strides; each morning the sun rose farther north, and a milder air melted the snows until Lannach's dales were a watery brawling. It took only one hundred thirty days from equinox to Last Sunrise—thereafter, during the endless light of High Summer, there would be nothing but rain or mist to cover an attack.

And if the Drakska were not whipped by autumn, reflected Trolwen grimly, there would be no point in trying further; the Flock would be done.

His wings thrust steadily at the sky, the easy strength-hoarding beat of a wanderer born. Under him, there was a broken white mystery of cloud, with the sea far beneath it peering through in a glimmer like polished glass; overhead lay a clear violet-blue roof, the night and the stars. Both moons were up, hasty Flichtan driving from horizon to horizon in a day and a half, Nua so much slower that her phases moved more rapidly than herself. He drew the cold, flowing darkness into his lungs, felt the thrust in muscles and the ripple in fur, but without the sensuous enjoyment of an ordinary flight.

He was thinking too hard about killing.

A commander should not show indecision, but he was young and gray Tolk the Herald would understand. "How shall we know that these beings are on the same raft as when you left?" he asked. He spoke in the measured, breath-conserving rhythm of a route flight. The wind muttered beneath his words.

"We cannot be sure, of course, Flockchief," replied Tolk. "But the fat one considered that possibility, too. He said he would manage, somehow, to be out on deck in plain view every day just at sunrise."

"Perhaps, though," worried Trolwen, "the Draka authorities will have locked him away, suspecting his help in your escape."

"What he did was probably not noticed in all the turmoil," said Tolk.

"And perhaps he cannot help us after all." Trolwen shivered. The Council had spoken strongly against this raid: too risky, too many certain casualties. The turbulent clans had roared their own disapproval. He had had difficulty persuading them all.

And if it turned out he was throwing away lives on something as grotesque as this, for no good purpose—Trolwen was as patriotic as any young male whose folk have been cruelly attacked; but he was not unconcerned about his own future. It had happened in the past that commanders who failed badly were read forever out of the Flock, like any common thief or murderer.

He flew onward.

A chill thin light had been stealing into the sky for a time. Now the higher clouds began to flush red, and a gleam went over the half-hidden sea. It was crucial to reach the Fleet at just about this moment, enough light to see what to do and not enough to give the enemy ample warning.

A Whistler, with the slim frame and outsize wings of adolescence, emerged from a fog-bank. The shrill notes of his lips carried far and keenly. Tolk, who as Chief Herald headed the education of these messenger-scouts, cocked his head and nodded. "We guessed it very well," he said calmly. "The rafts are only five buaska ahead."

"So I hear." Tension shook Trolwen's voice. "Now—"

He broke off. More of the youths were beating upwind into view, faster than an adult could fly. Their whistles wove into an exuberant battle music. Trolwen read the code like his own speech, clamped jaws together, and waved a hand at his standard bearer. Then he dove.

As he burst through the clouds, he saw the Fleet spread enormous, still far below him but covering the waters, from those islands called The Pups to the rich eastern driss banks. Decks and decks and decks cradled on a purplish-gray calm, masts raked upward like teeth, the dawn-light smote the admiral's floating castle and burned off his banner. There was an explosion skyward from rafts and canoes, as the Drak'honai heard the yells of their own sentries and went to arms.

Trolwen folded his wings and stooped. Behind him, in a wedge of clan-squadrons, roared three thousand Lannacha males. Even as he fell, he glared in search—where was that double-cursed Eart'a monster—*there!* The distance-devouring vision of a flying animal picked out three ugly shapes on a raft's quarterdeck, waving and jumping about.

Trolwen spread his wings to brake. "Here!" he cried. The standard bearer glided to a stop, hovered, and unfurled the red flag of Command. The squadrons changed from wedge to battle formation, peeled off, and dove for the raft.

The Drakska were forming their

own ranks with terrifying speed and discipline. "All smoke-snuffing gods!" groaned Trolwen. "If we could just have used a single squadron—a raid, not a full-scale battle—"

"A single squadron could hardly have brought the Eart'ska back alive, Flockchief," said Tolk. "Not from the very core of the enemy. We have to make it seem . . . not worth their while . . . to keep up the engagement, when we retreat."

"They know ghostly well what we've come for," said Trolwen. "Look how they swarm to that raft!"

The Flock troop had now punched through a shaken line of Draka patrols and reached water surface. One detachment attacked the target vessel, landed in a ring around the humans and then struck out to seize the entire craft. The rest stayed air-borne to repel the enemy's counter-assault.

It was simple, clumsy ground fighting on deck. Both sides were similarly equipped: weapon technology seems to diffuse faster than any other kind. Wooden swords set with chips of flint, fire-hardened spears, clubs, daggers, tomahawks, struck small wicker shields and leather harness. Tails smacked out, talons ripped, wings buffeted and cut with horny spurs, teeth closed in throats, fists battered on flesh. Hard-pressed, a male would fly upward—there was little attempt to keep ranks, it was a free-for-all. Trolwen had no special interest in that phase of the battle; having landed superior numbers, he knew he could take the raft, if only his aerial squadrons could keep the remaining Drakska off.

He thought—conventionally, in the wake of a thousand bards—how much like a dance a battle in the air was: intricate, beautiful, and terrible. To co-ordinate the efforts of a thousand or more warriors a-wing reached the highest levels of art.

The backbone of such a force was the archers. Each gripped a bow as long as himself in his foot talons, drew the cord with both hands and let fly, plucked a fresh arrow from the belly quiver with his teeth and had it ready to nook before the string snapped taut. Such a corps, trained almost from birth, could lay down a curtain which none might cross alive. But after the whistling death was spent, as it soon was, they must stream back to the bearers for more arrows. That was the most vulnerable aspect of their work, and the rest of the army existed to guard it.

Some cast bolas, some the heavy sharp-edged boomerang, some the weighted net in which a wing-tangled foe could plunge to his death. Blowguns were a recent innovation, observed among foreign tribes in the tropical meeting places. Here the Drakska were ahead: their guns had a bolt-operated repeater mechanism and fire-hardened wooden bayonets. Also, the separate military units in the Fleet were more tightly organized.

On the other hand, they still relied on an awkward set of horn calls to integrate their entire army. Infinitely more flexible, the Whistler corps darted from leader to leader, weaving the Flock into one great wild organism.

Up and down the battle ramped, while the sun rose and the clouds broke apart and the sea grew red-stained. Trolwen clipped his orders: Hunlu to reinforce the upper right flank, Torcha to feint at the admiral's raft while Srygen charged on the opposite wing—

But the Fleet was here, thought Trolwen bleakly, with all its arsenals: more missiles than his fliers, who were outnumbered anyway, could ever have carried. If this fight wasn't broken off soon—

The raft with the Eart'ska had now been seized. Draka canoes were approaching to win it back. One of them opened up with fire weapons: the dreaded, irresistible burning oil of the Fleet, pumped from a ceramic nozzle; catapults throwing vases of the stuff which exploded in gouts of flame on impact. Those were the weapons which had annihilated the boats owned by the Flock, and taken its coastal towns. Trolwen cursed with a reflex anguish when he saw.

But the Eart'ska were off the raft, six strong porters carrying each one in a specially woven net. By changing bearers often, those burdens could be taken to the Flock's mountain stronghold. The food boxes, hastily dragged up from the hold, were less difficult—one porter to each. A Whistler warbled success.

"Let's go!" Orders rattled from Trolwen, his messengers swooped to the appropriate squadrons. "Hunlu and Srygen, close ranks about the bearers; Dwarn fly above with half his command, the other half guard the left wing. Rearguards—"

The morning was perceptibly further along before he had disengaged. His nightmare had been that the larger Fleet forces would pursue. A running battle all the way home could have snapped the spine of his army. But as soon as he was plainly in retreat, the enemy broke contact and retired to decks.

"As you predicted, Tolk," panted Trolwen.

"Well, Flockchief," said the Herald with his usual calm, "they themselves wouldn't be anxious for such a melee. It would over-extend them, leave their rafts virtually defenseless —for all they know, your whole idea was to lure them into such a move. So they have merely decided that the Eart'ska aren't worth the trouble and risk: an opinion which the Eart'ska themselves must have been busily cultivating in them."

"Let's hope it's not a correct belief. But however the gods decree, Tolk . . . you still foresaw this outcome. Maybe you should be Commander."

"Oh, no. Not I. It was the fat Eart'ska who predicted this — in detail."

Trolwen laughed. "Perhaps, then, he should command."

"Perhaps," said Tolk, very thoughtfully, "he will."

TO BE CONTINUED

BRUTE .....

Illustrated by van Dongen

..............FARCE

BY ERIC FRANK RUSSELL

The difficult thing about dealing with a brilliant crackpot is, of course, that you can't possibly tell when something he does is too smart to be trusted, or too stupid to pay attention to. This makes life somewhat uncertain, and quite confusing....

TRUMBULL rumbled disgustedly, "You wouldn't think anyone could be advanced and primitive at one and the same time."

"Who, for instance?" invited Viosca.

"The Drenes and Salamards."

"Oh, are *they* at it again?"

"Yeah. They make me sick." Letting go a deep sigh, Trumbull jerked his thumb toward a message-form lying on his desk. "This time it's a Drene raid on the Salamards. Purely retaliatory, of course. Done under great provocation. As usual, the other guy started it."

Viosca gave a shrug of indifference. "They've been feuding ever since they invented rocketships and made contact. Mutual antipathy has been the result of technical progress. That's wholly their own fault. If they can't or won't adapt to each other, nobody else can make them do so. Darned if I can see why the Space Union worries about them. Why doesn't everyone just leave them to stew in their own juice?"

"For several reasons," answered Trumbull, heavily.

"Such as?"

"Firstly, their ships are antiquated by our standards. It's as much as they can do to reach out and smack each other. Things won't stay that way forever. Their vessels will improve as time goes on. It's going to be awkward if their behavior doesn't improve as well. We can't tolerate general hooliganism all over the galaxy."

"Fat chance they'd have to make nuisances of themselves," scoffed Viosca. "Any world in the Union could knock either of them silly without pausing for breath."

"The prime function of the Union is to prevent that sort of thing happening, not to let it happen successfully," Trumbull pointed out. "It exists to maintain universal peace. In effect, the Space Union is a guarantee that no world need take independent action to avert defeat or gain victory over another. The Union's existence depends upon its ability to keep the peace and that in turn depends upon everybody's respect for authority." He paused, chewed his bottom lip while he stared at the message-form, finished, "The Salamards and Drenes are undermining that authority. They're making the Union look like a bunch of monkeys. Next thing you know, the rot will set in. It's got to start somewhere."

"There may be something in what you say," Viosca conceded. "One or two Union members seem to have been getting pernickety of late."

"Sure thing! They're not going to sit and do their sums while somebody else thumbs his nose at teacher."

"Time teacher reached for the big stick."

"Easier said than done," Trumbull gave back with unconcealed sourness. "Every member of the Union maintains a pious neutrality so long as no action is taken. But the moment someone suggests letting the navy handle the problem, what happens? They start lining up like opposing football teams. Half of them assert that if anyone's going to be larruped it had better be the Drenes because they're the rats who originated all the trouble. The other half proclaim that the Salamards should be mussed up because they're the stinkers who started the fighting."

"I don't wonder there's a difference of opinion," Viosca offered. "I once looked into the so-called history of this feud. So many lies have been told by both sides that it's well-nigh impossible to say who's to blame."

"Both are to blame," declared Trumbull, impatiently. "They're living in the past and they can't go on doing that forever. Which means that despite their technical progress the Drenes and Salamards are mentally and morally backward. What you might call scientifically enlightened savages. Much more of their nonsense and the Union will fall to pieces for sheer lack of ability to impose discipline where needed."

"The only effective alternative to punishment is prevention," Viosca commented. "And it's an ancient law that prevention is better than cure."

"Correct," agreed Trumbull. "The trouble is that it's beautiful in theory but won't work out in practice. At the last Union Assembly we suggested policing the area of conflict.

Sanderson himself emphasized that the presence of Union warships would enable us to get unbiased evidence and name the real culprit once and for all. What reception did he get?"

"I don't know. I haven't read the latest report."

"All right, I'll tell you. Policing the Drene-Salamard sector means a lot of wasteful expenditure of ships, men and arms. So every world came up with fifty reasons why it should be exempt from contributing its share and offered fifty more reasons why others should do the dirty work. That, mister, leaves Terra to go it alone. You can imagine the Terran taxpayer's reaction if we tried to do so. There'd be one loud and united howl to get out of the Union. I told you the rot has to start somewhere."

"It has been said that no problem is unsolvable," remarked Viosca, doubtfully. "The guy who said it ought to be handed this one."

"He was a nut," opined Trumbull. He thought again, added, "Maybe he could do it at that. It takes a nut to crack something nutty."

Viosca stared at him, asked, "Do you really mean that?"

After further thought, Trumbull said, "I was merely shooting off. But having taken another look at it I think there might be something in it. A looney always has another angle and that's what we need right now."

"Well, if it's of any help," said Viosca, "I can produce the whackhead."

"Name of?"

"Sebastian Snodgrass."

"That's not funny," reproved Trumbull, frowning at him.

"Personally, I think it's tragic," said Viosca.

"You mean that really *is* his name?"

"Believe it or not."

"Holy cow!" said Trumbull.

Viosca leaned forward, went on, "I'll tell you something: a fellow who grows up with a name like that soon learns to use his wits. He *has* to!"

"And his fists, I'd say," Trumbull ventured.

"I'm not so sure about that. He told me once that any kid can handle a school bully without raising a finger."

"How?"

"All he need do is wear spectacles and let go with a warning yell of, 'If you break my glasses, you'll have to pay for them!' It works every time. The biggest tough in the class doesn't relish the idea of being nicked for twenty bucks." Viosca grinned at him, finished, "As you remarked, there's always another angle."

"It's got so I'll listen to anyone," said Trumbull. "Even a Snodgrass, may God forgive me. Go fetch me this character."

Trumbull looked him over with some disfavor. He was a skinny individual with a thin, peaky face, a pointed nose that had a distinct tinge of ruby at its tip, and pale, watery eyes in which floated around a vague suggestion of low cunning. The latter feature made Trumbull peculiarly uneasy; it gave him the feeling of being about to try and make mental contact with a thing from another world.

"Harumph!" began Trumbull importantly. "I have been examining your record, Snodgrass. To say the least it is rather odd."

"Anything is odd that is not commonplace," said Snodgrass. "Which is obvious by definition."

"We are not here to discuss the semantic aspects of everything I say," Trumbull reproved. He registered a scowl. "Take this item: it says you're the only man in the Space Service who insists on piloting a ship while wearing a derby hat. Where's the sense of that?"

"People, especially those of other species, tend to accept one at one's own valuation," explained Snodgrass, patiently.

"So what?"

"They jump to the conclusion that a pilot in a derby hat is the sort of individual who can get away with anything, including murder. Such a conclusion gives me quite a headstart."

"At that rate I might do better for myself wearing a pink turban," suggested Trumbull, sarcastically.

"Very probably," agreed Snodgrass, "if you can jack yourself out of the rut."

Trumbull went red, choked back a retort, gained control of himself. "We'll let your record ride—except for one item. Three years back you got Viosca out of a jam. I don't know the details and he won't tell me."

"It was merely a matter of throwing routine methods overboard. When you become a creature of habit you become halfblind, and so—"

"I don't want to know about it," said Trumbull. "It's no business of mine. All I'm interested in is the fact that Viosca thinks you might be able to help us solve a tough problem by taking it from an unorthodox viewpoint." He favored the other with a hairy stare. "So far as I'm concerned problems exist to be solved without regard for whether the methods are normal or abnormal."

"You must be getting desperate," observed Snodgrass, giving the cunning a ten per cent boost.

"Nothing of the sort," contradicted Trumbull, loudly. "I, personally, couldn't care less. However, others do care. Every time they get worried they start chivvying my department. I'm tired of being pushed around, see?"

"Nobody pushes me," observed Snodgrass with irritating virtue. "If anyone tries it, I just fall flat and he takes a dive over the body. Trouble with most folk is that they're slaves of habit and—"

"Shut up and listen to me. We've got a problem. I wouldn't dream of submitting it to a mere pilot, even a full-witted one. But I see from your record that you put in four years as Union Consul on Kastria. That was a minor post and a temporary one, but it does mean you've had diplomatic experience."

"I was tossed out," said Snodgrass, reminiscently.

Trumbull popped his eyes. "It doesn't say so in the official report."

"It wouldn't. In the diplomatic service they put everything diplomatically. Expulsion is called withdrawal. They get well paid if not overpaid for mangling the language. It goes to prove that even the higher-ups are slaves of routine and, therefore, it's no wonder that—"

"For the love of Mike," interrupted Trumbull, "will you cease propaganding and tell me exactly what happened?"

"There was a ruling clique on Kastria, a greedy and arrogant bunch. They started bucking the Union and using resulting tension as a pretext to rearm. It wasn't that they were really warlike; it was just that they intended to make plenty for themselves out of a big armaments program."

"So—?" Trumbull prompted.

"You can't arm without spending lots of money. You can't splurge money without first taking it from someone. You can't put a wholesale snatch on people and expect them to love it. The Kastrian rank and file didn't enjoy being nicked but could not see any way out of it. The Union didn't like what was going on, made repeated protests that were ignored and found themselves stuck with the situation."

"And then what happened?"

"I grew weary of passing official notes to and fro. There's an ancient Kastrian law that says no power on earth can take legal action against anyone who is mentally deficient. So I brought it to the attention of Kastrian taxpayers and asked what they were waiting for."

"You really did?"

"Sure, why not? There's no law against mentioning laws. Besides, when you can't nail someone from the front the obvious tactic is to set fire to his rear."

"Go on," urged Trumbull, impatiently.

"As usual with masses, there was doubt and a lot of hesitation until a few bolder spirits gave the lead, whereupon the rest followed like sheep. In no time at all the government's income shrank to nothing and there was a two-mile line-up outside the office of every mental specialist. The result was utter chaos. In less than ten days the Union had agreed to make a loan and withdraw me—on its own terms. I don't know what the terms were, but they'd be prize fools to give way without making plenty on the deal."

"There's been no trouble with Kastria for seven years," said Trumbull. "Or none that I've heard about." He plucked thoughtfully at his bottom lip, went on, "All right. Now we've got the Drenes and Salamards on our hands. I doubt that they have any laws protecting the dotty. Even if they had it would be of no use. They don't need saving from themselves; they need saving from each other."

"In that case, I'd say neither is worth saving," Snodgrass offered.

"You must be telepathic," said Trumbull. "I wouldn't give a bad nickel for the Drenes or Salamards. Unfortunately they cannot be ignored any more than a foul stench can be ignored. They're setting a bad example and it's got to be stopped, somehow." He let go a grunt of disgust. "There are Union Consuls on both worlds, Martin and Premczyk. To judge by results, their diplomatic efficiency approaches zero. Maybe you know them, huh?"

"I do. Martin is a bead-brain who does everything according to the book. If it doesn't work, he lets go the book and faints."

"You don't say?" mouthed Trumbull.

"I have just said it," Snodgrass pointed out. "As for Premczyk, he's less erudite than a co-pilot on a garbage truck. A typical slave of bureaucratic convention who—"

Blinking rapidly, Trumbull ordered, "Say that again."

Snodgrass repeated the shortcomings of Premczyk.

In complete silence Trumbull devoted some time to careful contemplation of the ceiling, then remarked gloomily, "I don't know whether we should."

"Should what?"

"Give you this problem to handle."

"Well," encouraged Snodgrass, "if one looks at it in the dim light of reason one would advise against it."

"Yeah," said Trumbull. "Yeah."

"On the other hand," Snodgrass went happily on, "it can be said in favor of a candidate who is not altogether with us that the opposition will be baffled by what wasn't there."

"I'm not so sure it isn't there," said Trumbull. "I wouldn't be surprised if you've got it stashed some place else." He made a gesture of sudden decision. "Anyway, we've only two alternatives: do nothing, or take a chance. We can't sit around and do nothing."

"Neither can you sit around and let the Drenes and Salamards continue doing something."

"I know, I know. So I'm dumping this in your lap," Trumbull went on. "I'm appointing you a Union Special Investigator. The Union Council will approve. They'd approve of me appointing a horse providing it could neigh some sense into somebody."

"A horse, not being inhibited by—"

"Shut up!" ordered Trumbull. "As an Union Special Investigator you'll be sure of a welcome on the Drene and Salamard worlds. They've given the razz to about seventy of them so far. You might as well start the next seventy. If we keep it up long enough, we're bound to strike the lucky number some day. Eventually we'll send a guy whose name happens to be Bingo. After that, we can all sleep in peace." He waved a hand in dismissal. "Get going."

"On one condition," said Snodgrass.

"What condition?"

"No repudiations."

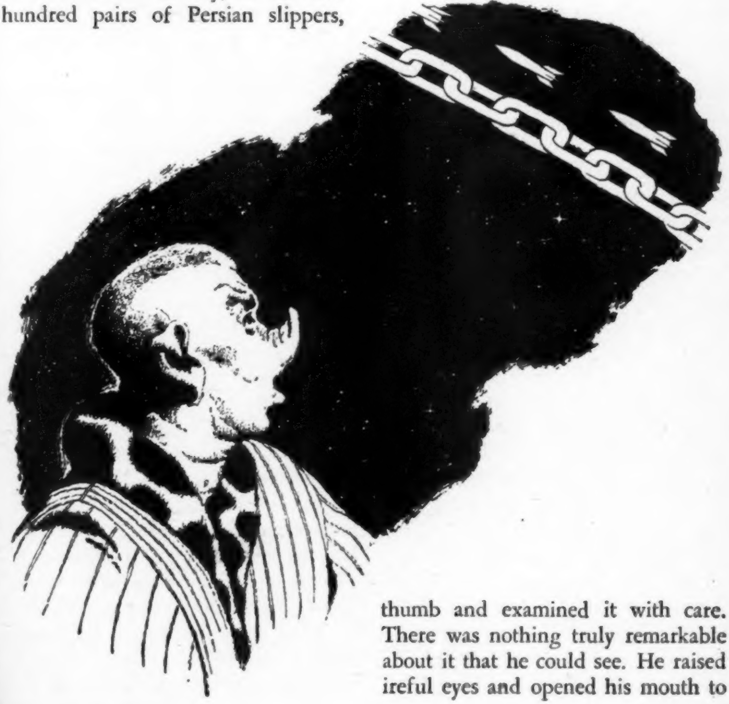
"What d'you mean?"

"I mean what I said—a free hand and no repudiations. If I ask for the Drene leader to be presented with a steam calliope, he's to be given one pronto. If I send an urgent requisition for a hen battery, or for five hundred pairs of Persian slippers, or for six sundials and a crook-handled umbrella, you rush them, express. No quibbling, see?"

"But I have to explain all expenditure," objected Trumbull, appalled by this list of possible demands.

"That's your job, isn't it? You to yours and I to mine." Snodgrass donned his derby hat, gazed with sudden interest at Trumbull's right hand and exclaimed, "Oh, look, a *thumb!*"

"Huh?" Trumbull jerked up the thumb and examined it with care. There was nothing truly remarkable about it that he could see. He raised ireful eyes and opened his mouth to



say something but found nobody there. The other had gone.

So he closed the mouth, had another long look at the thumb. He hadn't been so absorbed in it since he'd worn diapers.

After a while he said, "Nuts!" but it didn't seem very satisfactory.

Martin had a moon face, oyster eyes and had reduced life to three basic rules, namely, everything in triplicate, properly signed, and passed to the appropriate department. His reception of yet another Union Special Investigator was visibly pained and he viewed the derby hat as if it were a phenomenon extruded into his orderly existence from another dimension.

"Now," began Snodgrass, twitching his nose, "the story goes that the Drenes love the Salamards and the Salamards adore the Drenes but somehow they can't make it. Do you believe in this miracle of mass innocence?"

"I have no official opinions," said Martin, stiffly. "My duty is to report facts so far as they can reasonably be ascertained. That and no more."

"It needn't stop you thinking," offered Snodgrass. "And even in government service it is permissible to think occasionally, providing one does it with circumspection and takes care not to overstrain oneself."

"Are you suggesting that I am incapable of independent thought?" Martin demanded.

"Not at all. I doubt whether you're that far gone—yet," said Snodgrass. "But I do suggest that you dare not voice a political opinion without first gaining the kind permission of somebody whom you slavishly view as a superior."

"I resent that," informed Martin, bugging the oysters.

"So do I," said Snodgrass, resignedly. "I fear that nothing whatever can be done about it. Slowly but surely the entire universe is going to the dogs and much good may it do them."

"Going to who?"

"The dogs. You need a hearing-aid?"

"No, I don't," denied Martin, showing ire. "Neither do I require any lessons in diplomacy from you."

"How mad can we get?" asked Snodgrass of the blank wall. "I come six weeks as the crow flies to sup at the fount of his wisdom. I beg of him a candid opinion which he refuses. Finally, he says he wants no lessons from me. I don't wonder things are—"

"Look," chipped in Martin, "just exactly what do you want to know?"

"Now we're getting somewhere at last," said Snodgrass. "All I ask is your private opinion of who is to blame in this long-standing fracas. You're one of the two Union representatives on the spot and you've been here a long time. You must have a few secret ideas of some kind, probably based on unofficial evidence that has never been reported."

"I have no opinion," confessed Martin, simmering down, "except that it's quite impossible to decide who was the original culprit. And there's only one thing I can tell you strictly off the record."

"What's that?"

"Neither the Drenes or the Salamards ever invented rocketships. They're credited with having done so simultaneously, but that's the bunk. In the long, long ago some member of what is now a Union nation sold them the designs of out-of-date ships. Maybe he also got them tangling with each other so that he could cash in on the situation. We don't know for certain and there's no way of finding out."

"And you don't know who he was, either?"

"No. He could have been a Terran, Martian, Centaurian, Sirian, most anybody. Anyway, he was a slick customer with no scruples." Martin made a gesture of futility. "The official history of the trouble makes no mention of this fact because the Union cannot admit any responsibility in the matter."

"The usual tactic," commented Snodgrass. "Grab all the credit and brush-off the blame. Somebody could make a million selling artificial haloes to government departments."

"Well, I'd rather look like a saint than a nut," said Martin, eying the derby hat.

"I don't doubt it," Snodgrass gave back, "sainthood being strictly according to the book." He thought a while, went on, "Obviously we can't put a stop to this business by beating up both combatants because that means punishing the innocent along with the guilty and because Union members cannot agree which is which."

"Nor ever will agree," contributed Martin, positively, "seeing that the beginning of the squabble is hidden in the mists of the past."

"Therefore the only solution is to identify the guilty party without reference to the past."

Martin popped his eys again. "You can't do that. You can't make an arbitrary statement and base Union justice upon it. The members would never stand for that. They'd recognize it as a dangerous precedent and damn it on sight."

"Not," said Snodgrass, "if the culprit is compelled to name himself."

"Haha!" said Martin, sourly.

"Haha to you, too," retorted Snodgrass. "This Kazhim, the Drene leader, what sort of a character is he?"

"Kazhim is an autocrat with no holes in his head. Secretly he's one hundred per cent in favor of unending trouble with the Salamards."

"Why?"

"Because he could not pose as a great war leader without a war, he couldn't be the Lord Protector to people who need no protection. He is maintained in power by public fear of the Salamards and he knows it."

"In other words, you think I've little chance of crawling up his spine and getting a strangle hold on his conscience?"

"None whatever." Martin hesitated, looked doubtful, continued with sudden resolution, "I'll tell you something else. This is in confidence, mind you. It is not an official statement. Not a word to anyone else!"

"Say what's on your mind, man. Nobody can hang you for it."

"Zubigar, the Salamard dictator, is just such another as Kazhim. His position is bolstered by general fear of the Drenes. In that respect he and Kazhim might be blood-brothers. Sometimes I suspect them of playing each other's game, by mutual consent. You scratch my back and I'll scratch yours."

"A pretty setup," said Snodgrass, sniffing. "One worthy of political idiocy at its best." He grabbed his hat. "Oh, well—"

"Where're you going?" Martin demanded.

"To see Premczyk. The time has come to pass on to the next thought." He waved the hat. "Shoot the talcum to me, Malcolm."

"I beg your pardon."

"You heard," said Snodgrass.

Premczyk resembled the reincarnation of a brown bear. He had the stupid eyes, the barrel chest, the ungainly shuffle, the shaggy hair, but fortunately lacked the smell.

"Any ideas on who started it?"

"You ask me that?" complained Premczyk. "You think I am clairvoyant perhaps?"

"I'm not demanding facts, official or unofficial. I only want your private opinion."

"That is easy," said Premczyk. "The Drenes started it. The Drenes keep it up. But the Salamards will finish it."

"You really think so?"

"Yes."

"Why?"

"Because," explained Premczyk, blank-faced, "this is the Salamard world and I happen to be the Union Consul here. Sometimes one is asked unexpected questions and lacks the time to think up an unctuous reply. But if I believe what the Salamards believe, then I do not need time for thought—I automatically say what pleases them." Bending forward, he tapped the other on the knee with a forefinger that felt like a hammer. "That is diplomacy. I am a diplomat and a good one."

" 'Magic mirror on the wall, who is the fairest of them all?' " recited Snodgrass.

"You think maybe you could be a better one, eh?" challenged Premczyk.

"Not at all. I merely think I stand higher in my own category. For your interest, I am supposed to be a crackpot—and a good one."

"How I envy you," said Premczyk. "All of us would like to let ourselves go, but most of us cannot. Anxious parents, or rigid teachers, or adverse circumstances, have us tied down hand and foot."

Snodgrass took a long, careful look at him. "Back on Terra I assured Trumbull in good faith that you were a low-grade moron. It was a grossly unfair estimate. I withdraw it with apologies."

Premczyk grinned, showing big teeth. "There is no need to. I am flattered. Men like Zubigar have a pathetic craving for superiority. He is fond of me because he considers me witless. I play my proper part, you understand? It pleases me that you should think I play it well."

"I'm beginning to wonder whether I've similarly underrated Martin," said Snodgrass. "I described him as one who lives wholly by the book of words. Does he?"

"Yes, I'm afraid so." Premczyk let go a sigh. "But you must forgive him. He is seventy-seven years old and one is not very supple at that age. Put it to his credit that so far he has resisted all attempts to make him retire."

"I will." Snodgrass studied him speculatively, went on, "Martin said that Zubigar and Kazhim are two of a kind, namely, dictators exploiting the fears of the masses and possibly working in unarranged collusion. Do you agree?"

"Yes, it's a fair estimate."

"All right. Now suppose the Union concocts some effective method of removing Zubigar and Kazhim from their worlds, what d'you think would happen?"

"They'd be succeeded immediately by any of the horde of ambitious underlings who're waiting for such an opportunity."

"And the war would continue?"

"You can bet on that. The new dictators would be in precisely the same circumstances and motivated in the same way for the same reasons."

"Bang goes a minor idea," said Snodgrass, ruefully. "At least it had the virtue of being easy and inexpensive."

"Something effective will have to be done in the near future," opined Premczyk. "The Union is worried about this blatant challenge to its authority and about the possibility of both sides spreading trouble by developing bigger, better and faster ships. But there are other dangerous prospects, too."

"Such as?"

"So far the most they've managed on each raid has been to scatter a few dozen two-hundred-pound bombs around, all of ancient type loaded with little better than gunpowder. Result is that the damage hasn't been great, casualties have been low in number and the raids have served mostly to keep the pot on the boil." He paused, eyed his listener, said, "But in the long ago somebody sold them the secret of rocketships. We can never tell when another fool will come along and sell the secrets of better weapons, perhaps of nuclear weapons. If that ever happens, the balloon really will go up."

"Yes, you've got something there. It means two things. Firstly, action must be taken before it's too late. Secondly, the action must be effective."

"Correct," agreed Premczyk.

"Which in turn means that the Union has got to show its teeth in a manner on which all members can agree or at least in a manner that no member will oppose."

"You've summed it up in all respects save one," Premczyk pointed out. "The method."

"I know."

"To get complete agreement you'll have to find a way of placing the blame beyond all argument or dispute. You'll have to prove the guilt of one party or the other because the Union will never agree to the policy of beating up both of them. How're you going to do it?"

"I don't propose to try," Snodgrass informed. "I reckon it's sheer waste of time to exonerate Zubigar by damning Kazhim, or vice versa. The evidence is that they're equally culpable. We've got to find another way out of the mess."

"There isn't one," said Premczyk, moodily.

"There wasn't a cellar in our house until my Uncle Silas fell into it," said Snodgrass. "Life is full of little surprises." He took his hat, crammed it down over his ears. "The thing to do is go seek a little surprise, as the hart panteth after the waterbrook." He waved a hand. "See you at the altar, Walter."

"Pardon?"

"You heard," said Snodgrass.

His next appearance was on the great industrial world of Telethene, sector of Sirius, and the nearest fully developed outpost to the Drene-Salamard area. He strolled through a huge university as if he owned it, traced the room he wanted went inside. It was occupied by a wizened little Terran with white hair and shrewd blue eyes.

"Professor Langdale?"

"Yes. What can I do for you?"

"I'm given to understand that you're a leading authority on astrophysics and astromathematics and that what you don't know about this neck of the galaxy isn't worth knowing."

"Oh, I wouldn't say that," disclaimed Langdale, modestly.

"Of course you wouldn't. It would be unbecoming of you. Be gratified that I have said it." Snodgrass grabbed a chair unasked, sat down. "I want to know whether you can prepare some accurate and essential data concerning the Drene-Salamard area." He went on to explain in lengthy detail, finished, "As you can see, it's an official job and an urgent one. Your fee will be paid by the Union Security Department on Terra."

Langdale thought it over, his features holding a hint of amusement. "It could be done, I can assure you of that right now. But working it out will take time. I suppose you want these charts as soon as possible?"

"They'll be of no use until everything else is ready. The important thing is to learn the minimum number. I can't take my plan much further until I know that."

"Well, preparing the charts will require thirty to fifty days. It's a tedious task, I'm afraid. But I can let you know the minimum number within ten days."

"Good!" He stood up, noticed the other staring fascinatedly at the hat in his hand. "You like it?"

"Frankly, I wouldn't be seen dead in it," said Langdale.

"Neither shall I, if I can help it," agreed Snodgrass. "The black color accentuates the whiteness of the face and the result is horrid."

"Really?"

"Yes." He slammed the derby on his nut, went to the door. "Therefore I intend to abandon it at my last gasp." With that he went out, stuck his head inside and added by way of afterthought, "But not before."

After that he hung around for ten days, phoned the university.

Langdale said, "Four hundred twenty."

"That's the absolute minimum?"

"It is. What's more, it would have been more than a thousand except that we found it possible to devise an attenuated ellipse."

"Four-fifty would be better, eh?"

"Certainly," Langdale confirmed. "The more, the merrier. But you asked for the minimum number."

"I know I did. But I'll have to increase it to provide some sort of safety margin. You think four-fifty should cover it adequately?"

"Sure thing," said Langdale.

"Thanks!"

He spent the next fortnight running sweatily around twenty big engineering plants, arguing, persuading, cajoling and occasionally drawing lurid pictures of all those gold ingots stacked high in the Union's vaults.

There followed a waiting period of four months. It was tedious but not without events. Halfway through the Drenes came out with more ships, dumped a double load on the Salamards and virtuously announced a future policy of giving two bombs for each one received. The Salamards countered with the boast that they were about to produce bigger bangers and that in the near future one Salamard bomb would equal twenty Drene ones.

Trumbull sent an urgent signal: *Security Department reports you active on Telethene. What goes?*

He sent back the succinct reply: *Money.*

There came no answer to that. Perhaps Trumbull had subsided in disgust or possibly Viosca had reassured him. More likely, though, that the Union's Secret Service had made discreet inquiries and confirmed that the cash was not being splurged on wine, women and song.

In due time he collected the charts from Langdale, had a number of copies made. He paid a last visit to each of the engineering plants, finally went to see several of the biggest shipping and freighting outfits of which Telethene had more than a hundred.

His next tactic was to sit tight on Telethene and do nothing whatever until eventually the freighting outfits phoned him one by one. After the last had called, he packed, took a fast mail-boat to the Salamard world, had a conference with Premczyk. That done, a Union scout conveyed him to the Drene world where he walked in unannounced on Martin.

Martin said, with no enthusiasm, "You again?"

"Yes, and about time, too. Kazhim's getting uppish with his bigger fleet."

"So is Zubigar with his bigger bombs. There's nothing we can do about it."

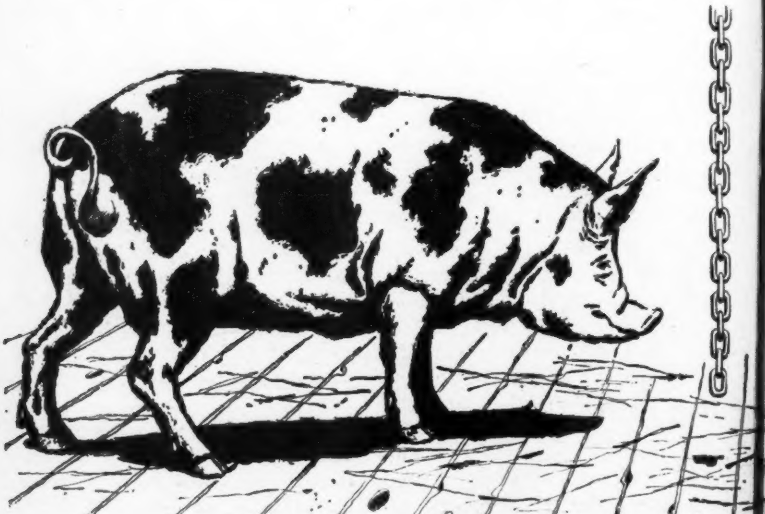
"On the contrary," announced Snodgrass, "the time has come to act. Premczyk will tend to Zubigar. You will introduce me to Kazhim so that I can perform a similar service."

"Don't be silly," said Martin.

"I may be crazy but I am not silly," Snodgrass reproved. "There's quite a difference in effectiveness. We are about to let Kazhim experience a moment of truth."

"Look," invited Martin, making a great show of patience, "whatever stunt you intend to pull on Kazhim or Zubigar will make not a darned bit of difference. A hundred others are waiting to jump on their thrones and sit while they're still warm. The political scene can't tolerate a vacuum. Immediately you get rid of one pair you'll have to cope with another pair and so *ad infinitum.*"

"We do not propose to get rid," said Snodgrass. "We intend only to make them sit still. Are you going



to take me to Kazhim, or do I have to tell Trumbull that you lacked the strength to totter with me to the palace?"

"It isn't necessary to jeer at my years," Martin told him.

"I didn't intend it that way. But if that's the way it looks, I'm sorry. I'm only trying to sting you into action."

"I don't have to be stung. One just can't be precipitate about such matters. Certain things must be considered."

"Such as what?"

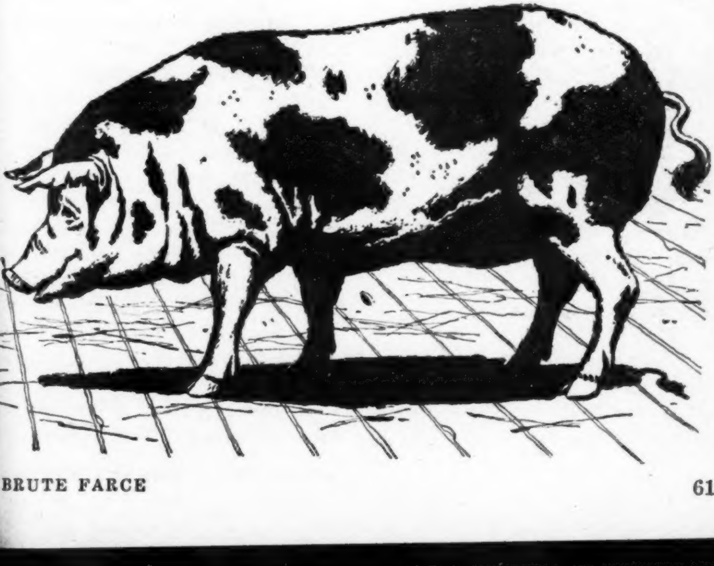
"I can't rush in on Kazhim without an appointment. It's irregular. It's contrary to protocol."

Snodgrass pointed to the desk. "There's the phone. Tell him the Union is mobilizing in readiness to attack. He'll say, 'Attack who?' You say, 'I don't know any more than that. But a Union Special Investigator is here. He wishes to see you personally and at once.' Curiosity and a guilty conscience will do the rest. We won't be able to get there fast enough to please him."

"But *is* the Union mobilizing?" asked Martin.

"What do you care? You tend strictly to the diplomatic side and leave me to tell all the lies."

"My orders are to co-operate as far as possible with Union Special Investigators," Martin informed, with unconcealed distaste. "So I've



no choice about the matter. However, while I shall do as you wish I must disclaim all responsibility for the results."

"Disclaim what you please. It's the tune the old cow died of. But for heaven's sake use that phone and let's get an armlock on Kazhim." Snodgrass glanced impatiently at his watch, added, "Premczyk will have Zubigar across the barrel within an hour."

"You hope," said Martin, skeptically.

He picked up the phone.

They reached the palace in twenty minutes. Kazhim had the long, pointed ears and the peculiar flexible pig-snout of his kind, only more so. His eyes were hard and cold. His teeth seemed to have been made with a do-it-yourself kit.

"Now," he began, in gritty tones, "what's all this about the Union mobilizing for war?"

"Preparing might be a better word," said Snodgrass. "We don't need to mobilize to settle what is really a minor issue."

"Be more specific," ordered Kazhim.

"The position is critical. The Union has decided that it is fed up with the Drene-Salamard squabble. It has got to stop and they're taking drastic action to stop it."

"How?"

"They're going to beat the living daylights out of the aggressor. No mercy will be shown. The guilty side will be blasted into submission, deprived of all ships and weapons and reduced to primitive status as an object lesson to the rest of the planetary confederation."

"That makes sense," approved Kazhim, his snout working around. "I've never been able to understand why the Union hasn't enforced discipline before now. The Salamards have been asking for trouble long enough."

"According to the Salamards, you Drenes are to blame."

"You could expect them to say that," shouted Kazhim, his eyes full of ire. "They are and always have been hopeless liars. Are you trying to tell me that the Union believes them?"

"No, we don't," soothed Snodgrass. "You say one thing, the Salamards say another and we have no means of deciding who is telling the truth."

"Then," Kazhim demanded, "how are you going to determine which is the guilty party?"

"By ignoring the past and considering only the future. As from today, and by Union definition, the aggressor will be the first one to make a raid on the other."

"But—"

"That puts you in a sweet position," Snodgrass went on. "All you need do is sit around and wait for Zubigar and his Salamards to put their heads in the noose. Immediately they do so they'll wish they'd never been born."

A strange series of expressions crossed Kazhim's face before he said, "Does Zubigar know about this?"

"Of course. We had to warn both sides, hadn't we?"

"Then I can tell you what he will do," offered Kazhim with malicious satisfaction. "He will carefully refrain from all further attack and wait for *us* to fall foul of the Union."

"In which case the war will have ended."

"No, it won't," Kazhim denied. "The Salamards cannot tolerate the idea of perpetual peace. If we keep them waiting until their patience runs out, they will do something about it, something typically treacherous."

"For example?"

"They'll blow up a couple of blocks of old property, claim that we made a sneak raid on them and then raid us by way of pretended retaliation. I've told the Union more times than I'd care to count that the Salamards are unscrupulous liars."

"Let 'em try—they won't get away with it," assured Snodgrass. He watched Kazhim interestedly, knowing full well what was churning in the dictator's mind, namely, that if Zubigar couldn't get away with it neither could he.

"I wish I could be sure of that," probed Kazhim, striving to look virtuous.

Snodgrass got to his feet, picked up his hat, said cryptically, "Neither you nor the Salamards can raid another planet without using ships. *Remember that!*"

Outside, Martin muttered gloomily, "I hope you know what you're doing."

"So do I," said Snodgrass. "Bet your life on that."

Martin stopped dead in his tracks, gazed at him wide-eyed. "You mean you don't really know?"

"This game is not based on what I think I can do but on what Kazhim and Zubigar think they can't do. That's clear, isn't it?"

"Like mud," said Martin.

"Try wearing a hat," Snodgrass advised. "It warms and stimulates the brain."

It was a year before he returned to Terra and found Trumbull sitting behind his desk and looking as if only a week had passed.

Trumbull let go a deep grunt and said, "About time, too. You've been gone long enough."

"I've been piloting around. When one job finishes I start on another. I have to eat and that's one rut I can't escape."

"It's taken quite a time to get a rough idea of what you've been doing," Trumbull complained. "A comprehensive report from you would have saved a lot of trouble."

"You didn't ask for a report. You asked for results. You've got them, haven't you?"

"Yes, it looks that way. All has been quiet in the Drene-Salamard sector for some time."

"Then what have you got to gripe about?"

"We didn't ask for a stack of bills, either," said Trumbull. "The

Union has paid them without quibble in view of the fact that the expenditure has proved effective."

"The whole lot don't amount to the cost of one space-corvette," Snodgrass pointed out.

"That may be. But we're entitled to know what we've bought and exactly why we've bought it." Jerking open a drawer, he extracted a wad of papers, thumbed through them. "Bill for professional services from the Sci-Art University of Deansburg on Telethene. Bill for haulage from the Transolar Shipping Company. Another from the Cosmic Tug and Towing Company."

"Yes, but—"

"Bills from a dozen other shipping outfits who've been lugging your junk all over the sky," continued Trumbull, doggedly. "And finally bills from various plants for a total of four hundred fifty snoderoos." He brushed the papers aside, leaned forward, said with emphasis, "It would be most gratifying to know what exactly is a snoderoo."

"That's easy. A snoderoo is a model spaceship of Snodgrass design. About thirty feet long by eight in diameter. Its outside bears Union insignia and a serial number, also ports, lenses, VHF antenna and various other contraptions of curious or sinister appearance according to the state of your conscience."

"Is that so?" said Trumbull. "Then all I can say is that we got a fleet of miniature ships dirt cheap."

"So you should—seeing they're not altogether with us."

"What d'you mean?"

"They're empty. There's nothing inside them."

Trumbull flopped back in his chair, stared with open incredulity. "You mean to say we've paid for a large batch of dolled-up empty cans?"

"Just that," agreed Sndograss, seeing nothing extraordinary in the purchase. "And you're lucky it wasn't a thousand or more."

"Come on—get busy explaining."

"I asked Langdale of Sci-Art whether it was possible to work out a permanent satellite orbit between the Drene and Salamard solar systems. He concocted a suitable ellipse. It's not permanent. For some reason I don't understand it slowly lengthens itself. But according to Langdale it's good for nearly four thousand years before it breaks into something big enough to get lost."

"And then?"

"Langdale also worked out the minimum number of satellites that would have to occupy that orbit so spaced that one would always be traveling within detector-range of anything crossing between the Drene and Salamard systems. The ellipse cut the number quite a piece because as soon as a snoderoo shoots out of range on one arm another comes into range on the other arm."

"And the total came to four-fifty?"

"Four-twenty. I added thirty and had them spaced a bit closer. It provided a safety factor and allowed for the orbit's gradual elongation."

"Yes, that makes sense," approved Trumbull.

"Why shouldn't it? Orthodoxy doesn't have the monopoly of sense," Snodgrass retorted. He carried on, "When the snoderoos had been positioned I told Kazhim we were all set to knock somebody's block off. Premczyk—to whom I humbly apologized for calling him a moron—similarly warned Zubigar."

"According to latest reports, Kazhim is planning to retire with his loot and Zubigar is surly with Premczyk."

"I'm not surprised. You can see what has happened. At that time neither of them cared a hoot about the Union threat because they were confident that we couldn't name the aggressor. Sometime later each has tried to sneak across and paste the other only to find a permanent string of snoderoos keeping continual watch. Each hasn't liked the situation, each has decided to play safe and let the other boob fall into the trap."

"That's all very nice—except for one thing," Trumbull objected. "The trap isn't a trap. If either of them discovers that those satellites are so many empty cans, we're sunk."

"They can't find out without pulling one apart. And they can't do that without approaching it and grabbing it. The one who does that is the aggressor."

"How the devil can we tell who grabbed it?"

"The snoderoo signals the information. That's what it's for, isn't it"

"But it can't do so if it's just an empty shell."

"Sh-h-h!" Snodgrass put a finger to his lips, gazed around with exaggerated anxiety. "*We* know that—but *they* don't. Think they dare take the risk?"

Trumbull breathed heavily and said, "You've got a nerve!"

"Not so," denied Snodgrass. "I merely figured that what has worked before can work again."

"How d'you mean?"

"When I was a kid down on the farm my old man bought a prize hog, put it in a pen. A little later he bought another, dumped it in the same pen. Those hogs behaved themselves daytimes but fought like mad nights. The old man got mighty worried about them damaging each other, decided there was nothing for it but to build another pen."

"Don't leave it at that," urged Trumbull. "He built another pen—and then what?"

"He didn't build another pen," Snodgrass contradicted. "He called in Uncle Silas to help build one. Uncle Silas allowed as how he could fix them critters with less bother. He hung a chain from the middle of the room so that its end dangled about four inches above the floor. After that, those hogs made no more trouble."

"But why?" demanded Trumbull. "Why?"

"I don't know. All I can think of is that every time they made a pass at each other the chain started swinging around, slid coldly and snakily across their backs and disconcerted them so much that they couldn't concentrate on bloody murder. Maybe a hog has an irresistible built-in reaction to snaky feelings across its back."

"Could be."

"So I thought it might be worthwhile giving the Drenes and Salamards a similar chain-reaction. I hung in space a chain of snoderoos and the mere sight of it gives them a funny feeling down the spine." Snodgrass stood up, stretched his arms, yawned. "Well, how's the sermon, Herman?"

"Eh?"

"You heard."

He went out, came back a moment later, dumped a parcel on the desk. "I nearly forgot. I brought you back a souvenir."

Trumbull picked at the string, tore aside the paper, opened the box, took out a pink silk turban. Its front was tastefully decorated with a large osprey feather.

He held it in one hand, eying it morbidly, then remarked, "I'll be candid with you—I haven't got the nerve."

"If one can't jump out of the rut, one can crawl," advised Snodgrass. "So keep it by and work up to it slowly."

"Yeah," promised Trumbull. "Yeah."

THE END

IN TIMES TO COME

Next month features Dean McLaughlin's yarn, "The Man On The Bottom." It's often been remarked that we're actually nearer reaching the surface of the Moon than we are to reaching the bottom of our own oceans. In one way, they're more remote . . . but in certain important respects they're not anywhere near as remote as people might wish . . .

For instance, in time of war. A dome city on the Moon would have a chance, at least, of fighting off attackers. But a dome city mining the mineral wealth of the sea bottom? Brother, in time of crises, the inhabitants of such a city would really be the "oppressed minority"! And what could the poor sitting-ducks do about it . . .?

THE EDITOR.

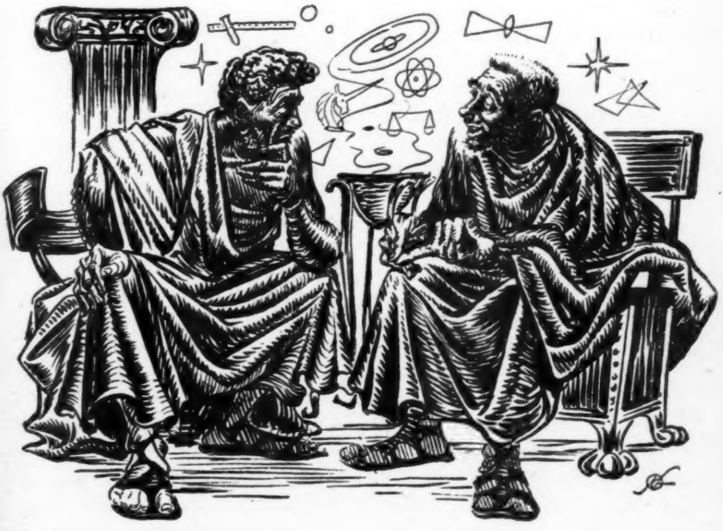
ARISTOTLE AND THE GUN

***It would,** obviously, be of immense advantage to modern people, if Science had just gotten started a thousand or so years earlier. Obviously....*

BY

L. SPRAGUE deCAMP

Illustrated by Freas



FROM:
Sherman Weaver, Librarian
The Palace
Paumanok, Sewanhaki
Sachimate of Lenape
Flower Moon 3, 3097

To:
Messire Markos Koukidas
Consulate of the Balkan Commonwealth
Kataapa, Muskhogian Federation

My dear Consul:

You have no doubt heard of our glorious victory at Ptaksit, when our noble Sachim destroyed the armored chivalry of the Mengwe by the brilliant use of pikemen and archery. (I suggested it to him years ago, but never mind.) Sagoyewatha and most of his Senecas fell, and the Oneidas broke before our countercharge. The envoys from the Grand Council of the Long House arrive tomorrow for a peace-pauwau. The roads to the south are open again, so I send you my long-promised account of the events that brought me from my own world into this one.

If you could have stayed longer on your last visit, I think I could have made the matter clear, despite the language-difficulty and my hardness of hearing. But perhaps if I give you a simple narrative, in the order in which things happened to me, truth will transpire.

Know, then, that I was born into a world that looks like this one on the map, but is very different as regards human affairs. I tried to tell you of some of the triumphs of our natural philosophers, of our machines and discoveries. No doubt you thought me a first-class liar, though you were too polite to say so.

None the less, my tale is true, though for reasons that will appear I cannot prove it. I was one of those natural philosophers. I commanded a group of younger philosophers, engaged in a task called a *project,* as a center of learning named Brookhaven, on the south shore of Sewanhaki twenty parasangs east of Paumanok. Paumanok itself was known as Brooklyn, and formed part of an even larger city called New York.

My project had to do with the study of space-time. (Never mind what that means but read on.) At this center we had learned to get vast amounts of power from sea water by what we called a fusion process. By this process we could concentrate so much power in a small space that we could warp the entity called space-time and cause things to travel in time as our other machines traveled in space.

When our calculations showed that we could theoretically hurl an object back in time, we began to build a machine for testing this hypothesis. First we built a small pilot model. In this we sent small objects back in time for short periods. We began with inanimate objects, and then found that a rabbit or rat could also be projected without harm. The time-translation would not be permanent; rather it acted like one of these rubber balls the Hesperians play games with. The object would stay in the desired time for a period determined by the power used to project it and its own mass, and would then return spontaneously to the time and place from which it started.

We had reported our progress regularly, but my chief had other matters on his mind and did not read our reports for many months. When he got a report saying that we were completing a machine to hurl human beings back in time, however, he awoke to what was going on, read our previous reports, and called me in.

"Sherm," he said, "I've been discussing this project with Washington, and I'm afraid they take a dim view of it."

"Why?" said I, astonished.

"Two reasons. For one thing, they think you've gone off the reservation. They're much more interested in the Antarctic Reclamation Project and want to concentrate all our appropriations and brain power on it.

"For another, they're frankly scared of this time machine of yours. Suppose you went back, say, to the time of Alexander the Great and shot Alexander before he got started? That would change all later history, and we'd go out like candles."

"Ridiculous," I said.

"Well, what *would* happen?"

"Our equations are not conclusive, but there are several possibilities. As you will see if you read Report No. 9, it depends on whether space-time has a positive or negative curvature. If positive, any disturbance in the past tends to be ironed out in subsequent history, so that things become more and more nearly identical with what they would have been anyway. If negative, then events will diverge more and more from their original pattern with time.

"Now, as I showed in this report, the chances are overwhelmingly in favor of a positive curvature. However, we intend to take every precaution and make our first tests for short periods, with a minimum—"

"That's enough," said my superior, holding up a hand. "It's very interesting, but the decision has already been made."

"What do you mean?"

"I mean Project A-257 is to be closed down and a final report written at once. The machines are to be dismantled, and the group will be put to work on another project.

"What?" I shouted. "But you can't stop us just when we're on the verge—"

"I'm sorry, Sherm, but I can. That's what the AEC decided at yesterday's meeting. It hasn't been officially announced, but they gave me positive orders to kill the project as soon as I got back here."

"Of all the lousy, arbitrary, benighted—"

"I know how you feel, but I have no choice."

I lost my temper and defied him, threatening to go ahead with the project anyway. It was ridiculous, because he could easily dismiss me for insubordination. However, I knew he valued my ability and counted on his wanting to keep me for that reason. But he was clever enough to have his cake and eat it.

"If that's how you feel," he said, "the section is abolished here and now. Your group will be broken up and assigned to other projects. You'll be kept on at your present rating with the title of consultant. Then when you're willing to talk sense, perhaps we can find you a suitable job."

I stamped out of his office and went home to brood. I ought now to tell you something of myself. I am old enough to be objective, I hope, and as I have but a few years left there is no point in pretense.

I have always been a solitary, misanthropic man. I had little interest in or liking of my fellow man, who naturally paid me back in the same coin. I was awkward and ill at ease in company. I had a genius for saying the wrong thing and making a fool of myself. I never understood people. Even when I watched and planned my own actions with the greatest care, I never could tell how others would react to them. To me men were and are an unpredictable, irrational, and dangerous species of hairless ape. While I could avoid some of my worst gaffes by keeping my own counsel and watching my every word, they did not like that either. They considered me a cold, stiff, unfriendly sort of person when I was only trying to be polite and avoid offending them.

I never married, and at the time of which I speak I was verging on middle age without a single close friend and no more acquaintances than my professional work required. I could justify my attitude by telling about the vices and follies of mankind, but I will not because you are, I think, familiar enough with these things already.

My only interest outside my work was a hobby of the history of science. Unlike most of my fellow-philosophers, I was historically-minded, with a good smattering of a Classical education. I belonged to the History of Science Society and wrote papers on the history of science for the periodical *Isis*.

I went back to my little rented house, feeling like Galileo. He was a scientist persecuted for his astronomical theories by the religious authorities of my world several centuries before my time, as Georg Schwartzhorn was a few years ago in this world's Europe.

I felt I had been born too soon. If only the world were scientifically more advanced, my genius would be appreciated and my personal difficulties solved.

Well, I thought, why is the world not scientifically more advanced? I reviewed the early growth of science. Why had not your fellow-countrymen, when they made a start towards a scientific age two thousand to twenty-five hundred years ago, kept at it until they made science the selfsupporting, self-accelerating thing it at last became—in my world, that is?

I knew the answers that historians of science had worked out. One was the effect of slavery, which made work disgraceful to a free man and therefore made experiment and invention unattractive because they looked like work. Another was the primitive state of the mechanical arts: things like making clear glass and accurate measuring devices. Another was the Hellenes' fondness for spinning cosmic theories without enough facts to go on, the result of which was that most of their theories were wildly wrong.

Well, thought I, could a man go back to this period and, by applying a stimulus at the right time and place, give the necessary push to set the whole trend rolling off in the right direction?

People had written fantastic stories about a man's going back in time and overawing the natives by a display of the discoveries of his own later era. More often than not, such a time-traveling hero came to a bad end. The people of the earlier time killed him as a witch, or he met with an accident, or something happened to keep him from changing history. But, knowing these dangers, I could forestall them by careful planning.

It would do little or no good to take back some major invention, like a printing press or an automobile, and turn it over to the ancients in the hope of grafting it on their culture. I could not teach them to work it in a reasonable time, and if it broke down or ran out of supplies there would be no way to get it running again.

What I had to do was to find a key mind and implant in it an appreciation of sound scientific method. He would have to be somebody who would have been important in any event, or I could not count on his influence spreading far and wide.

After study of Sarton and other historians of science, I picked Aristotle. You have heard of him, have you not? He existed in your world just as he did in mine. In fact, up to Aristotle's time our worlds were one and the same.

Aristotle was one of the greatest minds of all time. In my world, he was the first encyclopedist; the first man who tried to know everything, write down everything, and explain everything. He did much good original scientific work, too, mostly in biology.

However, Aristotle tried to cover so much ground, and accepted so many fables as facts, that he did much harm to science as well as good. For, when a man of such colossal intellect goes wrong, he carries with him whole generations of weaker minds who cite him as an infallible authority. Like his colleagues, Aristotle never appreciated the need for constant verification. Thus, though he was married twice, he said that men have more teeth than women. He never thought to ask either of his wives to open her mouth for a count. He never grasped the need for invention and experiment.

Now, if I could catch Aristotle at the right period of his career, perhaps I could give him a push in the right direction.

When would that be? Normally, one would take him as a young man. But Aristotle's entire youth, from seventeen to thirty-seven, was spent in Athens listening to Plato's lectures. I did not wish to compete with Plato, an overpowering personality who could argue rings around anybody. His viewpoint was mystical and antiscientific, the very thing I wanted to steer Aristotle away from. Many of Aristotle's intellectual vices can be traced back to Plato's influence.

I did not think it wise to present myself in Athens either during Aristotle's early period, when he was a student under Plato, or later, when he headed his own school. I could not pass myself off as a Hellene, and the Hellenes of that time had a contempt for all non-Hellenes, whom they called "barbarians." Aristotle was one of the worst offenders in this respect. Of course this is a universal human failing, but it was particularly virulent among Athenian intellectuals. In his later Athenian period, too, Aristotle's ideas would probably be too set with age to change.

I concluded that my best chance would be to catch Aristotle while he was tutoring young Alexander the Great at the court of Philip the Second of Macedon. He would have regarded Macedon as a backward country, even though the court spoke Attic Greek. Perhaps he would be bored with bluff Macedonian stag-hunting squires and lonesome for intellectual company. As he would regard the Macedonians as the next thing to *barbaroi,* another barbarian would not appear at such a disadvantage there as at Athens.

Of course, whatever I accomplished with Aristotle, the results would depend on the curvature of space-time. I had not been wholly frank with my superior. While the equations tended to favor the hypothesis of a positive curvature, the probability was not overwhelming. Perhaps my efforts would have little effect on history, or perhaps the effect would grow and widen like ripples in a pool. In the latter case the existing world would, as my superior said, be snuffed out."

Well, at that moment I hated the existing world and would not give a snap of my fingers for its destruction. I was going to create a much better one and come back from ancient times to enjoy it.

Our previous experiments showed that I could project myself back to ancient Macedon with an accuracy of about two months temporally and a half-parasang spatially. The machine included controls for positioning the time-traveler anywhere on the globe, and safety devices for locating him above the surface of the earth, not in a place already occupied by a solid object. The equations showed that I should stay in Macedon about nine weeks before being snapped back to the present.

Once I had made up my mind, I worked as fast as I could. I telephoned my superior—you remember what a telephone is?—and made my peace. I said:

"I know I was a hotheaded fool Fred, but this thing was my baby; my one chance to be a great and famous scientist. I might have got a Nobel prize out of it."

"Sure, I know, Sherm," he said. "When are you coming back to the lab?"

"Well . . . uh . . . what about my group?"

"I held up the papers on that, in case you might change your mind. So if you come back, all will go on organization-wise as before."

"You want that final report on A-257, don't you?" I said, trying to keep my voice level.

"Sure."

"Then don't let the mechanics start to dismantle the machines until I've written the report."

"No; I've had the place locked up since yesterday."

"O.K. I want to shut myself in with the apparatus and the data-sheets for a while and bat out the report without being bothered."

"That'll be fine," he said.

My first step in getting ready for my journey was to buy a suit of Classical traveler's clothing from a theatrical costume company. This comprised a knee-length pull-over tunic or chiton, a short horseman's cloak or chlamys, knitted buskins, sandals, a broad-brimmed black felt hat, and a staff. I stopped shaving, though I did not have time to raise a respectable beard.

My auxiliary equipment included a purse of coinage of the time, mostly golden Macedonian staters. Some of these coins were genuine, bought from a numismatic supply house, but most were copies I cast myself in the laboratory at night. I made sure of being rich enough to live decently for longer than my nine weeks' stay. This was not hard, as the purchasing power of precious metals was more than fifty times greater in the Classical world than in mine.

I wore the purse attached to a heavy belt next to my skin. From this belt also hung a missile-weapon called a *gun,* which I have told you about. This was a small gun, called a pistol or revolver. I did not mean to shoot anybody, or expose the gun at all if I could help it. It was there as a last resort.

I also took several small devices of our science to impress Aristotle: a pocket microscope and a magnifying glass, a small telescope, a compass, my timepiece, a flashlight, a small camera, and some medicines. I intended to show these things to people of ancient times only with the greatest caution. By the time I had slung all these objects in their pouches and cases from my belt, I had a heavy load. Another belt over the tunic supported a small purse for day-to-day buying and an all-purpose knife.

I already had a good reading knowledge of Classical Greek, which I tried to polish by practice with the spoken language and listening to it on my talking machine. I knew I should arrive speaking with an accent, but we had no way of knowing exactly what Attic Greek sounded like.

I decided, therefore, to pass myself off as a traveler from India. Nobody would believe I was a Hellene. If I said I came from the north or west, no Hellene would listen to me, as they regarded Europeans as warlike but half-witted savages. If I said I was from some well-known civilized country like Carthage, Egypt, Babylonia, or Persia, I should be in danger of meeting someone who knew those countries and of being exposed as a fraud. To tell the truth of my origin, save under extraordinary circumstances, would be most imprudent. It would lead to my being considered a lunatic or a liar, as I can guess that your good self has more than once suspected me of being.

An Indian, however, should be acceptable. At this time, the Hellenes knew about that land only a few wild rumors and the account of Ktesias of Knidos, who made a book of the tales he picked up about India at the Persian court. The Hellenes had heard that India harbored philosophers. Therefore thinking Greeks might be willing to consider Indians as almost as civilized as themselves.

What should I call myself? I took a common Indian name, Chandra, and Hellenized it to Zandras. That, I knew, was what the Hellenes would do anyway, as they had no "tch" sound and insisted on putting Greek inflectional endings on foreign names. I would not try to use my own name, which is not even remotely Greek or Indian-sounding. (Some day I must explain the blunders in my world that led to Hesperians' being called "Indians.")

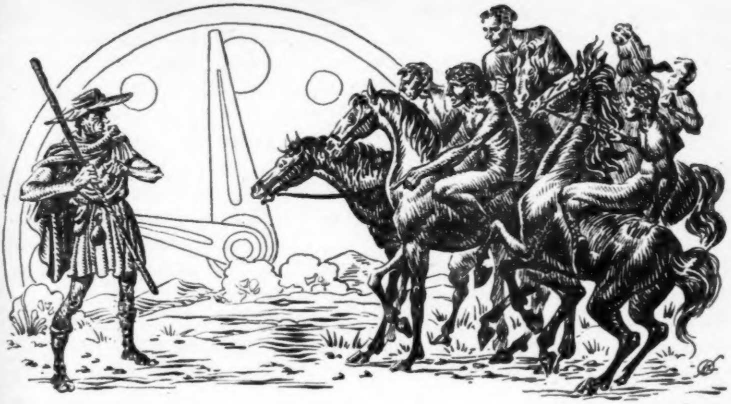
The newness and cleanliness of my costume bothered me. It did not look worn, and I could hardly break it in around Brookhaven without attracting attention. I decided that if the question came up, I should say: yes, I bought it when I entered Greece, so as not to be conspicuous in my native garb.

During the day, when not scouring New York for equipment, I was locked in the room with the machine. While my colleagues thought I was either writing my report or dismantling the apparatus, I was getting ready for my trip.

Two weeks went by thus. One day a memorandum came down from my superior, saying: "How is that final report coming?"

I knew then I had better put my plan into execution at once. I sent back a memorandum: "Almost ready for the writing machine."

That night I came back to the laboratory. As I had been doing this often, the guards took no notice. I went to the time-machine room, locked the door from the inside, and



got out my equipment and costume.

I adjusted the machine to set me down near Pella, the capital of Macedon, in the spring of the year 340 before Christ in our system of reckoning (976 Algonkian). I set the auto-actuator, climbed inside, and closed the door.

The feeling of being projected through time really cannot be described. There is a sharp pain, agonizing but too short to let the victim even cry out. At the same time there is the feeling of terrific acceleration, as if one were being shot from a catapult, but in no particular direction.

Then the seat in the passenger-compartment dropped away from under me. There was a crunch, and a lot of sharp things jabbed me. I had fallen into the top of a tree.

I grabbed a couple of branches to save myself. The mechanism that positioned me in Macedon, detecting solid matter at the point where I was going to materialize, had raised me up above the treetops and then let go. It was an old oak, just putting out its spring leaves.

In clutching for branches I dropped my staff, which slithered down through the foliage and thumped the ground below. At least it thumped something. There was a startled yell.

Classical costume is impractical for tree-climbing. Branches kept knocking off my hat, or snagging my cloak, or poking me in tender places not protected by trousers. I ended my climb with a slide and a fall of several feet, tumbling into the dirt.

As I looked up, the first thing I saw was a burly, black-bearded man in a dirty tunic, standing with a knife in his hand. Near him stood a pair of oxen yoked to a wooden plow. At his feet stood a water jug.

The plowman had evidently finished a furrow and lain down to rest himself and his beasts when the fall of my staff on him and then my arrival in person aroused him.

Around me stretched the broad Emathian Plain, ringed by ranges of stony hills and craggy mountains. As the sky was overcast, and I did not dare consult my compass, I had no sure way of orienting myself, or even telling what time of day it was. I assumed that the biggest mountain in sight was Mount Bermion, which ought to be to the west. To the north I could see a trace of water. This would be Lake Ludias. Beyond the lake rose a range of low hills. A discoloration on the nearest spur of these hills might be a city, though my sight was not keen enough to make out details, and I had to do without my eyeglasses. The gently rolling plain was cut up into fields and pastures with occasional trees and patches of marsh. Dry brown grasses left over from winter nodded in the wind.

My realization of all this took but a flash. Then my attention was brought back to the plowman, who spoke. I could not understand a word. But then, he would speak Macedonian. Though this can be deemed a Greek dialect, it differed so from Attic Greek as to be unintelligible.

No doubt the man wanted to know what I was doing in his tree. I put on my best smile and said in my slow fumbling Attic: "Rejoice! I am lost, and climbed your tree to find my way."

He spoke again. When I did not respond he repeated his words more loudly, waving his knife.

We exchanged more words and gestures, but it was evident that neither had the faintest notion of what the other was trying to say. The plowman began shouting, as ignorant people will when faced by the linguistic barrier.

At last I pointed to the distant headland overlooking the lake, on which there appeared a discoloration that might be the city. Slowly and carefully I said:

"Is that Pella?"

"Nai, Pella!" The man's mien became less threatening.

"I am going to Pella. Where can I find the philosopher Aristotles?" I repeated the name.

He was off again with more gibberish, but I gathered from his expression that he had never heard of any Aristoteles. So I picked up my hat and stick, felt through my tunic to make sure my gear was all in place, tossed the rustic a final *"Chaire!"* and set off.

By the time I had crossed the muddy field and come out on a cart track, the problem of looking like a seasoned traveler had solved itself. There were green and brown stains on my clothes from the scramble down the tree; the cloak was torn; the branches had scratched my limbs and face; my feet and lower legs were covered with mud. I also became aware that, to one who has lived all his life with his loins decently swathed in trousers and underdrawers, Classical costume is excessively drafty.

I glanced back to see the plowman still standing with one hand on his plow, looking at me in puzzled fashion. The poor fellow had never been able to decide what, if anything, to do about me.

When I found a road, it was hardly more than a heavily-used cart track, with a pair of deep ruts and the space between them alternating stones, mud, and long grass.

I walked towards the lake and passed a few people on the road. To one used to the teeming traffic of my world, Macedon seemed dead and deserted. I spoke to some of the people, but ran into the same barrier of language as with the plowman.

Finally a two-horse chariot came along, driven by a stout man wearing a headband, a kind of kilt, and high-laced boots. He pulled up at my hail.

"What is it?" he said, in Attic not much better than mine.

"I seek the philosopher, Aristoteles of Stageira. Where can I find him?"

"He lives in Mieza."

"Where is that?"

The man waved. "You are going the wrong way. Follow this road back the way you came. At the ford across the Bottiais, take the right-hand fork, which will bring you to Mieza and Kition. Do you understand?"

"I think so," I said. "How far is it?"

"About two hundred stadia."

My heart sank to my sandals. This meant five parasangs, or a good two-days' walk. I thought of trying to buy a horse or a chariot, but I had never ridden or driven a horse and saw no prospect of learning how soon enough to do any good. I had read about Mieza as Aristotle's home in Macedon, but, as none of my maps had shown it, I had assumed it to be a suburb of Pella.

I thanked the man, who trotted off, and set out after him. The details of my journey need not detain you. I was benighted far from shelter through not knowing where the villages were, attacked by watchdogs, eaten alive by mosquitoes, and invaded by vermin when I did find a place to sleep the second night. The road skirted the huge marshes that spread over the Emathian Plain west of Lake Ludias. Several small streams came down from Mount Bermion and lost themselves in this marsh.

At last I neared Mieza, which stands on one of the spurs of Mount Bermion. I was trudging wearily up the long rise to the village when six youths on little Greek horses clattered down the road. I stepped to one side, but instead of cantering past they pulled up and faced me in a semicircle.

"Who are you?" asked one, a smallish youth of about fifteen, in fluent Attic. He was blond and would have been noticeably handsome without his pimples.

"I am Zandras of Pataliputra," I said, giving the ancient name for

Patna on the Ganges. "I seek the philosopher Aristoteles."

"Oh, a barbarian!" cried Pimples. "We know what the Aristoteles thinks of these, eh, boys?"

The others joined in, shouting noncompliments and bragging about all the barbarians they would some day kill or enslave.

I made the mistake of letting them see I was getting angry. I knew it was unwise, but I could not help myself. "If you do not wish to help me, then let me pass," I said.

"Not only a barbarian, but an insolent one!" cried one of the group, making his horse dance uncomfortably close to me.

"Stand aside, children!" I demanded.

"We must teach you a lesson," said Pimples. The others giggled.

"You had better let me alone," I said, gripping my staff in both hands.

A tall handsome adolescent reached over and knocked my hat off. "That for you, cowardly Asiatic!" he yelled.

Without stopping to think, I shouted an English epithet and swung my staff. Either the young man leaned out of the way or his horse shied, for my blow missed him. The momentum carried the staff past my target and the end struck the nose of one of the other horses.

The pony squealed and reared. Having no stirrups, the rider slid off the animal's rump into the dirt. The horse galloped off.

All six youths began screaming. The blond one, who had a particularly piercing voice, mouthed some threat. The next thing I knew, his horse bounded directly at me. Before I could dodge, the animal's shoulder knocked me head over heels and the beast leaped over me as I rolled. Luckily, horses' dislike of stepping on anything squashy saved me from being trampled. I scrambled up as another horse bore down upon me. By a frantic leap I got out of its way, but I saw that the other boys were jockeying their mounts to do likewise.

A few paces away rose a big pine. I dodged in among its lower branches as the other horses ran at me. The youths could not force their mounts in among these branches, so they galloped round and round and yelled. Most of their talk I could not understand, but I caught a sentence from Pimples:

"Ptolemaios! Ride back to the house and fetch bows or javelins!"

Hoofbeats receded. I could not see clearly through the pine needles, but I inferred what was happening. The youths would not try to rush me on foot, first because they liked being on horseback, and if they dismounted they might lose their horses or have trouble remounting; second, because as long as I kept my back to the tree they would have a hard time getting at me through the tangle of branches, and I could hit and poke them with my stick as I came. Though not an unusually tall man in my own world, I was much bigger than any of these boys.

But this was a minor consideration. I recognized the name "Ptolemaios" as that of one of Alexander's companions, who in my world became King Ptolemy of Egypt and founded a famous dynasty. Young Pimples, then, must be Alexander himself. I was in a real predicament. If I stayed where I was, Ptolemaios would bring back missiles for target practice with me as the target. I could, of course, shoot some of the boys with my gun, which would save me for the time being. But in an absolute monarchy, killing the crown prince's friends, let alone the crown prince himself, is no way to achieve a peaceful old age, regardless of the provocation.

While I was thinking of these matters and listening to my attackers, a stone swished through the branches and bounced off the trunk. The small dark youth who had fallen off his horse had thrown the rock and was urging his friends to do likewise. I caught glimpses of Pimples and the rest dismounting and scurrying around for stones, a commodity with which Greece and Macedon are notoriously well supplied. More stones came through the needles, caroming from the branches. One the size of my fist struck me lightly in the shin.

The boys came closer so that their aim got better. I wormed my way around the trunk to put it between me and them, but they saw the movement and spread out around the tree. A stone grazed my scalp, dizzying me and drawing blood. I thought of climbing, but as the tree became more thinner with height, I should be more exposed the higher I got, as well as being less able to dodge while perched in the branches than while I was on solid ground.

That is how things stood when I heard hoofbeats again. This is the moment of decision, I thought. Ptolemaios is coming back with missile weapons. If I used my gun I might doom myself in the long run, but it would be ridiculous to stand there and let them riddle me while I had an unused weapon.

I fumbled under my tunic and unsnapped the safety strap that kept the pistol in its holster. I pulled the weapon out and checked its projectiles.

A deep voice broke into the bickering. I caught phrases: ". . . Insulting an unoffending traveler . . . how do you know he is not a prince in his own country? The king shall hear of this. . . . Like newly-freed slaves, not like princes and gentlemen . . ."

I pushed towards the outer limits of the screen of pine needles. A heavy-set brown-bearded man on a horse was haranguing the youths, who had dropped their stones. Pimples said:

"We were only having a little sport."

I stepped out from the branches, walked over to where my battered hat lay, and put it on. Then I said to the newcomer: "Rejoice! I am glad you came before your boys' play got too rough." I grinned, determined to act cheerful if it killed me. Only iron self-control would get me through this difficulty.

The man grunted. "Who are you?"

"Zandras of Pataliputra, a city in India. I seek Aristoteles the philosopher."

"He insulted us—" began one of the youths, but Brownbeard ignored him. He said:

"I am sorry you have had so rude an introduction to our royal house. This mass of youthful insolence"—he indicated Pimples—"is the Alexandros Philippou, heir to the throne of Makedonia." He introduced the others: Hephaistion, who had knocked my hat off and was now holding the others' horses; Nearchos, who had lost his horse; Ptolemaois, who had gone for weapons; and Harpalos and Philotas. He continued:

"When the Ptolemaios dashed into the house I inquired the reason for his haste, learned of their quarrel with you, and came out forthwith. They have misapplied their master's teachings. They should not behave thus even to a barbarian like yourself, for in so doing they lower themselves to the barbarian's level. I am returning to the house of Aristoteles. You may follow."

The man turned his horse and started walking it back towards Mieza. The six boys busied themselves with catching Nearchos' horse.

I walked after him, though I had to dogtrot now and then to keep up. As it was uphill, I was soon breathing hard. I panted:

"Who . . . my lord . . . are you?"

The man's beard came round and he raised an eyebrow. "I thought you would know. I am Antipatros, regent of Makedonia."

Before we reached the village proper, Antipatros turned off through a kind of park, with statues and benches. This, I supposed, was the Precinct of the Nymphs which Aristotle used as a school ground. We went through the park and stopped at a mansion on the other side. Antipatros tossed the reins to a groom and slid off his horse.

"Aristoteles!" roared Antipatros. "A man wishes to see you."

A man of about my own age—the early forties—came out. He was of medium height and slender build, with a thin-lipped, severe-looking face and a pepper-and-salt beard cut short. He was wrapped in a billowing himation or large cloak, with a colorful scroll-patterned border. He wore golden rings on several fingers.

Antipatros made a fumbling introduction: "Old fellow, this is . . . ah . . . what's-his-name from . . . ah . . . some place in India." He told of rescuing me from Alexander and his fellow-delinquents, adding: "If you do not beat some manners into your pack of cubs soon, it will be too late."

Aristotle looked at me sharply. "It ith always a pleasure to meet men from afar. What brings you here, my friend?"

I gave my name and said: "Being accounted something of a philosopher in my own land, I thought my visit to the West would be incomplete without speaking to the greatest Western philosopher. And when I asked who he was, everyone told me to seek out Aristoteles Nikomachou."

Aristotle purred. "It ith good of them to thay tho. Ahem. Come in and join me in a drop of wine. Can you tell me of the wonders of India?"

"Yes indeed, but you must tell me in turn of your discoveries, which to me are much more wonderful."

"Come, come, then. Perhapth you could thtay over a few days. I shall have many, many things to athk you."

That is how I met Aristotle. He and I hit it off, as we said in my world, from the start. We had much in common. Some people would not like Aristotle's lisp, or his fussy, pedantic ways, or his fondness for worrying any topic of conversation to death. But he and I got along fine. That afternoon, in the house that King Philip had built for Aristotle to use as the royal school, he handed me a cup of resinated wine and asked:

"Tell me about the elephant, that great beast we have heard of with a tail at both ends. Does it truly exist?"

"Indeed it does," I said, and went on to tell what I knew of elephants, while Aristotle scribbled notes on a piece of papyrus.

"What do they call the elephant in India?" he asked.

The question caught me by surprise, for it had never occurred to me to learn ancient Hindustani along with all the other things I had to know for this expedition. I sipped the wine to give me time to think. I have never cared for alcoholic liquors, and this stuff tasted awful to me, but for the sake of my objective I had to pretend to like it. No doubt I should have to make up some kind of gibberish—but then a mental broad jump carried me back to the stories of Kipling I had read as a boy.

"We call it a *hathi,*" I said. "Though of course there are many languages in India."

"How about that Indian wild ath of which Ktesias thpeakth, with a horn in the middle of itth forehead?"

"You had better call it a nose-horn—*rhinokeros*—for that is where its horn really is, and it is more like a gigantic pig than an ass . . ."

As dinner-time neared, I made some artful remarks about going out to find accommodations in Mieza, but Aristotle—to my joy—would have none of it. I should stay right there at the school; my polite protestations of unworthiness he waved aside.

"You muth plan to thtop here for months," he said. "I shall never, never have such a chance to collect data on India again. Do not worry about expense; the king pays all. You are . . . ahem . . . the first barbarian I have known with a decent intellect, and I get lonethome for good tholid talk. Theophrastos has gone to Athens, and my other friends come to these backlands but theldom."

"How about the Macedonians?"

"*Aiboi!* Thome like my friend Antipatros are good fellows, but most are as lackwitted as a Persian grandee. And now tell me of Patal . . . what is your city's name?"

Presently Alexander and his friends came in. They seemed taken aback at seeing me closeted with their master. I put on a brisk smile and said: "Rejoice, my friends!" as if nothing untoward had happened. The boys glowered and whispered among themselves, but did not attempt any more disturbance at that time.

When they gathered for their lecture next morning, Aristotle told them: "I am too busy with the gentleman from India to waste time pounding unwanted wisdom into your miserable little thouls. Go shoot some rabbitth or catch some fish for dinner, but in any cathe begone!"

The boys grinned. Alexander said: "It seems the barbarian has his uses after all. I hope you stay with us forever, good barbarian!"

After they had gone, Antipatros came in to say good-by to Aristotle. He asked me with gruff good will how I was doing and went out to ride back to Pella.

The weeks passed unnoticed and the flowers of spring came out while I visited Aristotle. Day after day we strolled about the Precinct of the Nymphs, talking, or sat indoors when it rained. Sometimes the boys followed us, listening; at other times we talked alone. They played a couple of practical jokes on me, but, by pretending to be amused when I was really furious, I avoided serious trouble with them.

I learned that Aristotle had a wife and a little daughter in another part of the big house, but he never let me meet the lady. I only caught glimpses of them from a distance.

I carefully shifted the subject of our daily discourse from the marvels of India to the more basic questions of science. We argued over the nature of matter and the shape of the solar system. I gave out that the Indians were well on the road to the modern concepts—modern in my world, that is—of astronomy, physics, and so forth. I told of the discoveries of those eminent Pataliputran philosophers: Kopernikos in astronomy, Neuton in physics, Darben in evolution, and Mendeles in genetics. (I forgot; these names mean nothing to you, though an educated man of my world would recognize them at once through their Greek disguise.)

Always I stressed *method*: the need for experiment and invention and for checking each theory back against the facts. Though an opinionated and argumentative man, Aristotle had a mind like a sponge, eagerly absorbing any new fact, surmise, or opinion, whether he agreed with it or not.

I tried to find a workable compromise between what I knew science could do on one hand and the limits of Aristotle's credulity on the other. Therefore I said nothing about flying machines, guns, buildings a thousand feet high, and other technical wonders of my world. Nevertheless, I caught Aristotle looking at me sharply out of those small black eyes one day.

"Do you doubt me, Aristoteles?" I said.

"N-no, no," he said thoughtfully. "But it does theem to me that, were your Indian inventors as wonderful as you make out, they would have fabricated you wings like those of Daidalos in the legend. Then you could have flown to Makedonia directly, without the trials of crothing Persia by camel."

"That has been tried, but men's muscles do not have enough strength in proportion to their weight."

"Ahem. Did you bring anything from India to show the thkills of your people?"

I grinned, for I had been hoping for such a question. "I did fetch a few small devices," said I, reaching into my tunic and bringing out the magnifying glass. I demonstrated its use.

Aristotle shook his head. "Why did you not show me this before? It would have quieted my doubtth."

"People have met with misfortune by trying too suddenly to change the ideas of those around them. Like your teacher's teacher, Sokrates."

"That is true, true. What other devices did you bring?"

I had intended to show my devices at intervals, gradually, but Aristotle was so insistent on seeing them all that I gave in to him before he got angry. The little telescope was not powerful enough to show the moons of Jupiter or the rings of Saturn, but it showed enough to convince Aristotle of its power. If he could not see these astronomical phenomena himself, he was almost willing to take my word that they could be seen with the larger telescopes we had in India.

One day a light-armed soldier galloped up to us in the midst of our discussions in the Precinct of Nymphs. Ignoring the rest of us, the fellow said to Alexander: "Hail, O Prince! The king, your father, will be here before sunset."

Everybody rushed around cleaning up the place. We were all lined up in front of the big house when King Philip and his entourage arrived on horseback with a jingle and a clatter, in crested helmets and flowing mantles. I knew Philip by his one eye. He was a big powerful man, much scarred, with a thick curly black beard going gray. He dismounted, embraced his son, gave Aristotle a brief greeting, and said to Alexander:

"How would you like to attend a siege?"

Alexander whooped.

"Thrace is subdued," said the king, "but Byzantion and Perinthos have declared against me, thanks to Athenian intrigue. I shall give the Perintheans something to think about besides the bribes of the Great King. It is time you smelled blood, youngster; would you like to come?"

"Yes, yes! Can my friends come too?"

"If they like and their fathers let them."

"O King!" said Aristotle.

"What is it, spindle-shanks?"

"I trust thith ith not the end of the prince's education. He has much yet to learn."

"No, no; I will send him back when the town falls. But he nears the age when he must learn by doing, not merely by listening to your rarefied wisdom. Who is this?" Philip turned his one eye on me.

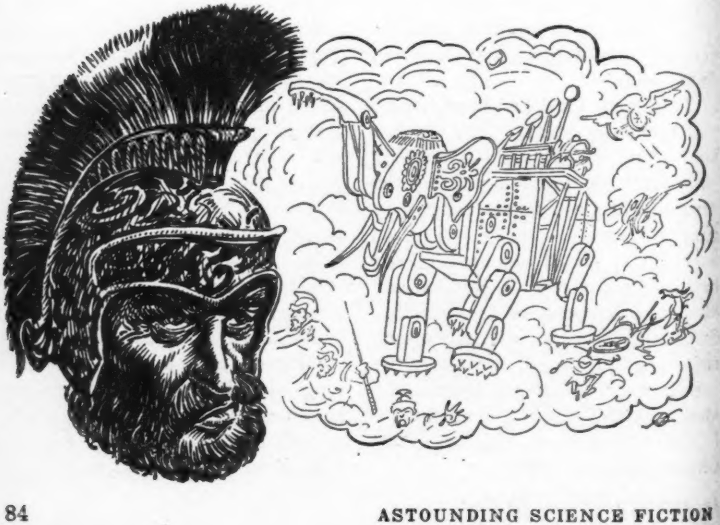
"Zandras of India, a barbarian philothopher."

Philip grinned in a friendly way and clapped me on the shoulder. "Rejoice! Come to Pella and tell my generals about India. Who knows? A Macedonian foot may tread there yet."

"It would be more to the point to find out about Persia," said one of Philip's officers, a handsome fellow with a reddish-brown beard. "This man must have just come through there. How about it, man? Is the bloody Artaxerxes still solid on his throne?"

"I know little of such matters," I said, my heart beginning to pound at the threat of exposure. "I skirted the northernmost parts of the Great King's dominions and saw little of the big cities. I know nothing of their politics."

"Is that so?" said Redbeard, giving me a queer look. "We must talk of this again."



They all trooped into the big house, where the cook and the serving-wenches were scurrying about. During dinner I found myself between Nearchos, Alexander's little Cretan friend, and a man-at-arms who spoke no Attic. So I did not get much conversation, nor could I follow much of the chatter that went on among the group at the head of the tables. I gathered that they were discussing politics. I asked Nearchos who the generals were.

"The big one at the king's right is the Parmenion," he said, "and the one with the red beard is the Attalos."

When the food was taken away and the drinking had begun, Attalos came over to me. The man-at-arms gave him his place. Attalos had drunk a lot of wine already, but if it made him a little unsteady it did not divert him.

"How did you come through the Great King's domain?" he asked. "What route did you follow?"

"I told you, to the north," I said.

"Then you must have gone through Orchoe."

"I—" I began, then stopped. Attalos might be laying a trap for me. What if I said "yes" and Orchoe was really in the south? Or suppose he had been there and knew all about the place? Many Greeks and Macedonians served the Great King as mercenaries.

"I passed through many places whose names I never got straight," I said. "I do not remember if Orchoe was among them."

Attalos gave me a sinister smile through his beard. "Your journey will profit you little, if you cannot remember where you have been. Come, tell me if you heard of unrest among the northern provinces."

I evaded the question, taking a long pull on my wine to cover my hesitation. I did this again and again until Attalos said: "Very well, perhaps you are really as ignorant of Persia as you profess. Then tell me about India."

"What about it?" I hiccuped; the wine was beginning to affect me, too.

"As a soldier, I should like to know of the Indian art of war. What is this about training elephants to fight?"

"Oh, we do much better than that."

"How so?"

"We have found that the flesh-and-blood elephant, despite its size, is an untrustworthy war-beast because it often takes fright and stampedes back through its own troops. So the philosophers of Pataliputra make artificial elephants of steel with rapid-fire catapults on their backs."

I was thinking in a confused way of the armored war-vehicles of my own world. I don't know what made me tell Attalos such ridiculous lies. Partly it was to keep him off the subject of Persia.

Partly it was a natural antipathy between us. According to history, Attalos was not a bad man, though at times a reckless and foolish one. But it annoyed me that he thought he could pump me by subtle questions, when he was about as subtle as a ton of bricks. His voice and manner said as plainly as words: I am a shrewd, sharp fellow; watch out for me, everybody. He was the kind of man who, if told to spy on the enemy, would don an obviously false beard, wrap himself in a long black cloak, and go slinking about the enemy's places in broad daylight, leering and winking and attracting as much attention as possible. No doubt, too, he had prejudiced me against him by his alarming curiosity about my past.

But the main cause for my rash behavior was the strong wine I had drunk. In my own world I drank very little and so was not used to these carousals.

Attalos was all eyes and ears at my tale of mechanical elephants. "You do not say!"

"Yes, and we do even better than that. If the enemy's ground forces resist the charge of our iron elephants, we send flying chariots, drawn by gryphons, to drop darts on the foe from above." It seemed to me that never had my imagination been so brilliant.

Attalos gave an audible gasp. "What else?"

"Well . . . ah . . . we also have a powerful navy, you know, which controls the lower Ganges and the adjacent ocean. Our ships move by machinery, without oars or sails."

"Do the other Indians have these marvels, too?"

"Some, but none is so advanced as the Pataliputrans. When we are outnumbered on the sea, we have a force of tame Tritons who swim under the enemy's ships and bore holes in their bottoms."

Attalos frowned. "Tell me, barbarian, how it is that, with such mighty instruments of war, the Palalal . . . the Patapata . . . the people of your city have not conquered the whole world?"

I gave a shout of drunken laughter and slapped Attalos on the back. "We *have,* old boy, we have! You Macedonians have just not yet found out that you are our subjects!"

Attalos digested this, then scowled blackly. "I think you have been making a fool of me! Of *me!* By Herakles, I ought—"

He rose and swung a fist back to clout me. I jerked an arm up to guard my face.

There came a roar of "Attalos!" from the head of the table. King Philip had been watching us.

Attalos dropped his fist, muttered something like "Flying chariots and tame Tritons, forsooth!" and stumbled back to his own crowd.

This man, I remembered, did not have a happy future in store. He was destined to marry his niece to Philip, whose first wife Olympias would have the girl and her baby killed after Philip's assassination. Soon afterwards, Attalos would be murdered by Alexander's orders. It was on the tip of my tongue to give him a veiled warning, but I forebore. I had attracted enough hostile attention already.

Later, when the drinking got heavy, Aristotle came over and shooed his boys off to bed. He said to me: "Let uth walk outthide to clear our heads, Zandras, and then go to bed, too. These Makedones drink like thponges. I cannot keep up with them."

Outside, he said: "The Attalos thinkth you are a Persian thpy."

"A spy? Me? In Hera's name, why?" Silently I cursed my folly in making an enemy without any need. Would I never learn to deal with this human species?

Aristotle said: "He thays nobody could path through a country and remain as ignorant of it as you theem to be. Ergo, you know more of the Persian Empire than you pretend, but wish uth to think you have nothing to do with it. And why should you do that, unleth you are yourthelf a Persian? And being a Persian, why should you hide the fact unleth you are on thome hostile mission?"

"A Persian might fear anti-Persian prejudice among the Hellenes. Not that I am one," I hastily added.

"He need not. Many Persians live in Hellas without molestation. Take Artabazos and his sons, who live in Pella, refugees from their own king."

Then the obvious alibi came to me, long after it should have. "The fact is I went even farther north than I said. I went around the northern ends of the Caspian and Euxine Seas, and so did not cross the Great King's domains save through the Bactrian deserts."

"You did? Then why did you not thay tho? If that is true, you have thettled one of our hottest geographical dithputes: whether the Cathpian is a closed thea or a bay of the Northern Ocean."

"I feared nobody would believe me."

"I am not sure what to believe, Zandras. You are thtrange man. I do not think you are a Persian, for no Persian was ever a philothopher. It is good for you that you are not."

"Why?"

"Because I *hate* Persia!" he hissed.

"You do?"

"Yeth. I could list the wrongs done by the Great Kings, but it ith enough that they theized my beloved father-in-law by treachery and tortured and crucified him. People like Isokrates talk of uniting the Hellenes to conquer Persia, and Philippos may try it if he lives. I hope he does. However," he went on in a different tone, "I hope he does it without dragging the cities of Hellas into it, for the repositories of civilization have no busineth getting into a brawl between tyrants."

"In India," said I sententiously, "we are taught that a man's nationality means nothing and his personal qualities everything. Men of all nations come good, bad, and indifferent."

Aristotle shrugged. "I have known virtuouth Persians, too, but that monstrouth, bloated empire. . . . No thtate can be truly civilized with more than a few thousand citizens."

There was no use telling him that

large states, however monstrous and bloated he thought them, would be a permanent feature of the landscape from then on. I was trying to reform, not Aristotle's narrow view of international affairs, but his scientific methodology.

Next morning King Philip and his men and Aristotle's six pupils galloped off towards Pella, followed by a train of baggage mules and the boys' personal slaves. Aristotle said:

"Let uth hope no chance thlingthtone dashes out Alexandros' brains before he has a chance to show his mettle. The boy has talent, and may go far, though managing him is like trying to plow with a wild bull. Now, let uth take up the question of atoms again, my dear Zandras, about which you have been talking thuch utter rubbish. First, you must admit that if a thing exists, partth of it must also exist. Therefore there is no thuch thing as an indivisible particle . . ."

Three days later, while we were still hammering at the question of atoms, we looked up at the clatter of hoofs. Here came Attalos and a whole troop of horsemen. Beside Attalos rode a tall swarthy man with a long gray beard. This man's appearance startled me into thinking he must be another time-traveler from my own time, for he wore a hat, coat, and pants. The mere sight of these familiar garments filled me with homesickness for my own world, however much I hated it when I lived in it.

Actually, the man's garb was not that of one from my world. The hat was a cylindrical felt cap with ear flaps. The coat was a brown knee-length garment with trousers to match. Over the coat the man wore a yellow vest embroidered with faded red and blue flowers. The whole outfit looked old and threadbare, with patches showing. He was a big craggy-looking fellow, with a great hooked nose, wide cheek bones, and deep-set eyes under bushy beetling brows.

They all dismounted, and a couple of grooms went around collecting the bridles to keep the horses from running off. The soldiers leaned on their spears, with their bronze bucklers slung on their backs, in a circle around us. These spears were the ordinary six-foot jabbing pikes of the Greek hoplite, not the twelve- or fifteen-foot *sarissai* of the phalanx.

Attalos said: "I should like to ask your guest some more philosophical questions, O Aristoteles."

"Athk away."

Attalos turned, not to me, but to the tall graybeard. He said something I did not catch, and then the man in trousers spoke to me in a language I did not know.

"I do not understand," I said.

The graybeard spoke again, in what sounded like a different tongue. He did this several times, using a different-sounding speech each time, but each time I had to confess ignorance.

"Now you see," said Attalos. "He pretends not to know Persian, Median, Armenian, or Aramaic. He could not have traversed the Great King's dominions from east to west without learning at least one of these."

"Who are you, my dear sir?" I asked Graybeard.

The old man gave me a small dignified smile and spoke in Attic with a guttural accent. "I am Artavazda, or Artabazos as the Hellenes say, once governor of Phrygia but now a poor pensioner of King Philippos."

This, then, was the eminent Persian refugee of whom Aristotle had spoken.

"I warrant he does not even speak Indian," said Attalos.

"Certainly," I said, and started off in English: *"Now is the time for all good men to come to the aid of the party. Four score and seven years ago our fathers brought forth . . ."*

"What would you call that?" Attalos asked Artavazda.

The Persian spread his hands. "I never heard the like. But then, India is a vast country of many tongues."

"I was not—" I began, but Attalos kept on:

"What race would you say he belonged to?"

"I do not know. The Indians I have seen were much darker, but there might be light-skinned Indians for all I know."

"If you will listen, general, I will explain," I said. "For most of the journey I was not even in the Persian Empire. I crossed through Bactria and went around the north of the Caspian and Euxine Seas."

"Oh, so now you tell another story?" said Attalos. "Any educated man knows the Caspian is but a deep bay opening into the Ocean River to the north. Therefore you could not go around it. So in trying to escape, you but mire yourself deeper in your own lies."

"Look here," said Aristotle. "You have proved nothing of the sort, O Attalos. Ever thince Herodotos there have been those who think the Cathpian a closed thea—"

"Hold your tongue, professor," said Attalos. "This is a matter of national security. There is something queer about this alleged Indian, and I mean to find out what it is."

"It is not queer that one who comes from unknown distant lands should tell a singular tale of his journey."

"No, there is more to it than that. I have learned that he first appeared in a tree top on the farm of the freeholder Diktys Pisandrou. Diktys remembers looking up into the tree for crows before he cast himself down under it to rest. If the Zandras had been in the tree, Diktys would have seen him, as it was not yet fully in leaf. The next instant there was the crash of a body falling into the branches, and Zandras' staff smote Diktys on the head. Normal mortal men do not fall out of the sky into trees."

"Perhapth he flew from India. They have marvelous mechanisms there, he tells me," said Aristotle.

"If he survives our interrogation in Pella, perhaps he can make me a pair of wings," said Attalos. "Or better yet, a pair for my horse, so he shall emulate Pegasos. Meanwhile, seize and bind him, men!"

The soldiers moved. I did not dare submit for fear they would take my gun and leave me defenseless. I snatched up the hem of my tunic to get at my pistol. It took precious seconds to unsnap the safety strap, but I got the gun out before anybody laid a hand on me.

"Stand back or I will blast you with lightning!" I shouted, raising the gun.

Men of my own world, knowing how deadly such a weapon can be, would have given ground at the sight of it. But the Macedonians, never having seen one, merely stared at the device and came on. Attalos was one of the nearest.

I fired at him, then whirled and shot another soldier who was reaching out to seize me. The discharge of the gun produces a lightninglike flash and a sharp sound like a close clap of thunder. The Macedonians cried out, and Attalos fell with a wound in his thigh.

I turned again, looking for a way out of the circle of soldiers, while confused thoughts of taking one of their horses flashed through my head. A heavy blow in the flank staggered me. One of the soldiers had jabbed me with his spear, but my belt kept the weapon from piercing me. I shot at the man but missed him in my haste.

"Do not kill him!" screamed Aristotle.

Some of the soldiers backed up as if to flee; others poised their spears. They hesitated for the wink of an eye, either for fear of me or because Aristotle's command confused them. Ordinarily they would have ignored the philosopher and listened for their general's orders, but Attalos was down on the grass and looking in amazement at the hole in his leg.

As one soldier dropped his spear and started to run, a blow on the head sent a flash of light through my skull and hurled me to the ground, nearly unconscious. A man behind me had swung his spear like a club and struck me on the pate with the shaft.

Before I could recover, they were all over me, raining kicks and blows. One wrenched the gun from my hand. I must have lost consciousness, for the next thing I remember is lying in the dirt while the soldiers tore off my tunic. Attalos stood over me with a bloody bandage around his leg, leaning on a soldier. He looked pale and frightened but resolute. The second man I had shot lay still.

"So that is where he keeps his infernal devices!" said Attalos, indicating my belt. "Take it off, men."

The soldiers struggled with the clasp of the belt until one impatiently sawed through the straps with his dagger. The gold in my money pouch brought cries of delight.

I struggled to get up, but a pair of soldiers knelt on my arms to keep me down. There was a continuous mumble of talk. Attalos, looking over the belt, said:

"He is too dangerous to live. Even stripped as he is, who knows but what he will soar into the air and escape by magic?"

"Do not kill him!" said Aristotle. "He has much valuable knowledge to impart."

"No knowledge is worth the safety of the kingdom."

"But the kingdom can benefit from his knowledge. Do you not agree?" Aristotle asked the Persian.

"Do not drag me into this, pray," said Artavazda. "It is no concern of mine."

"If he is a danger to Makedonia, he should be destroyed at once," said Attalos.

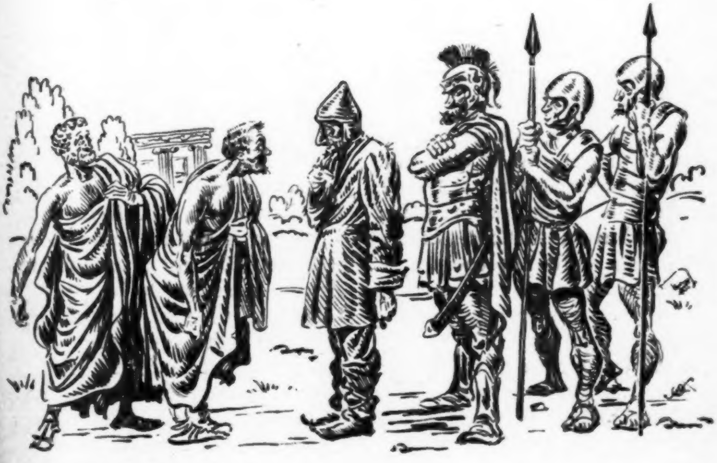
"There is but little chance of his doing harm now," said Aristotle, "and an excellent chance of his doing us good."

"Any chance of his doing harm is too much," said Attalos. "You philosophers can afford to be tolerant of interesting strangers, but if they carry disaster in their baggage it is on us poor soldiers that the brunt will fall. Is it not so, Artabazos?"

"I have done what you asked and will say no more," said Artavazda. "I am but a simple-minded Persian nobleman who does not understand your Greek subtleties."

"I can increase the might of your armies, general!" I cried to Attalos.

"No doubt, and no doubt you can also turn men to stone with an incantation, as the Gorgons did with their glance." He drew his sword and felt the edge with his thumb.



"You will thlay him for mere thuperstition!" wailed Aristotle, wringing his hands. "At least let the king judge the matter."

"Not superstition," said Attalos; "murder." He pointed to the dead soldier.

"I come from another world! Another age!" I yelled, but Attalos was not to be diverted.

"Let us get this over with," he said. "Set him on his knees, men. Take my sword, Glaukos; I am too unsteady to wield it. Now bow your head, my dear barbarian, and—"

In the middle of Attalos' sentence, he and the others and all my surroundings vanished. Again there came that sharp pain and sense of being jerked by a monstrous catapult. . . .

I found myself lying in leaf-mold with the pearl-gray trunks of poplars all around me. A brisk breeze was making the poplar-leaves flutter and show their silvery bottoms. It was too cool for a man who was naked save for sandals and socks.

I had snapped back to the year 1981 of the calendar of my world, which I had set out from. But where was I? I should be near the site of the Brookhaven National Laboratories in a vastly improved super-scientific world. But there was no sign of super-science here; nothing but poplar trees.

I got up, groaning, and looked around. I was covered with bruises and bleeding from nose and mouth.

The only way I had of orienting myself was the boom of a distant surf. Shivering, I hobbled towards the sound. After a few hundred paces I came out of the forest on a beach. This beach could be the shore of Sewanhaki, or Long Island as we called it, but there was no good way of telling. There was no sign of human life; just the beach curving into the distance and disappearing around headlands, with the poplar forest on one side and the ocean on the other.

What, I wondered, had happened? Had science advanced so fast as a result of my intervention that man had already exterminated himself by scientific warfare? Thinkers of my world had concerned themselves with this possibility, but I had never taken it seriously.

It began to rain. In despair I cast myself down on the sand and beat it with my fists. I may have lost consciousness again.

At any rate, the next thing I knew was the now-familiar sound of hoofs. When I looked up, the horseman was almost upon me, for the sand had muffled the animal's hoofbeats until it was quite close.

I blinked with incredulity. For an instant I thought I must be back in the Classical era still. The man was a warrior armed and armored in a style much like that of ancient times. At first he seemed to be wearing a helmet of Classical Hellenic type. When he came closer I saw that this was not quite true, for the crest was made of feathers instead of horsehair. The nasal and cheek-plates hid most of his face, but he seemed dark and beardless. He wore a shirt of scale-mail, long leather trousers, and low shoes. He had a bow and a small shield hung from his saddle and a slender lance slung across his back by a strap. I saw that this could not be ancient times because the horse was fitted with a large, well-molded saddle and stirrups.

As I watched the man stupidly, he whisked the lance out of its boot. He spoke in an unknown language.

I got up, holding my hands over my head in surrender. The man kept repeating his question, louder and louder, and making jabbing motions. All I could say was "I don't understand" in the languages I knew, none of which seemed familiar to him.

Finally he maneuvered his horse around to the other side of me, barked a command, pointed along the beach the way he had come, and prodded me with the butt of the lance. Off I limped, with rain, blood, and tears running down my hide.

You know the rest, more or less. Since I could not give an intelligible account of myself, the Sachim of Lenape, Wayotan the Fat, claimed me as a slave. For fourteen years I labored on his estate at such occupations as feeding hogs and chopping kindling. When Wayotan died and the present Sachim was elected, he decided I was too old for that kind of work, especially as I was half crippled from the beatings of Wayotan and his overseers. Learning that I had some knowledge of letters—for I had picked up spoken and written Algonkian in spite of my wretched lot—he freed me and made me official librarian.

In theory I can travel about as I like, but I have done little of it. I am too old and weak for the rigors of travel in this world, and most other places are, as nearly as I can determine, about as barbarous as this one. Besides, a few Lenapes come to hear me lecture on the nature of man and the universe and the virtues of the scientific method. Perhaps I can light a small spark here after I failed in the year 340 B.C.

When I went to work in the library, my first thought was to find out what had happened to bring the world to its present pass.

Wayotan's predecessor had collected a considerable library which Wayotan had neglected, so that some of the books had been chewed by rats and others ruined by dampness. Still, there was enough to give me a good sampling of the literature of this world, from ancient to modern times. There were even Herodotos' history and Plato's dialogues, identical with the versions that existed in my own world.

I had to struggle against more language barriers, as the European languages of this world are different from, though related to, those of my own world. The English of today, for instance, is more like the Dutch of my own world, as a result of England's never having been conquered by the Normans. I also had the difficulty of reading without eyeglasses. Luckily most of these manuscript books are written in a large, clear hand. A couple of years ago I did get a pair of glasses, imported from China, where the invention of the printing press has stimulated their manufacture. But, as they are a recent invention in this world, they are not so effective as those of mine.

I rushed through all the history books to find out when and how your history diverged from mine. I found that differences appeared quite early. Alexander still marched to the Indus but failed to die at thirty-two on his return. In fact he lived fifteen years longer and fell at last in battle with the Sarmatians in the Caucasus Mountains. I do not know why that brief contact with me enabled him to avoid the malaria-mosquito that slew him in my world. Maybe I aroused in him a keener interest in India than he would otherwise have had, leading him to stay there longer so that all his subsequent schedules were changed. His empire held together for most of a century instead of breaking up right after his death as it did in my world.

The Romans still conquered the whole Mediterranean, but the course of their conquests and the names of the prominent Romans were all different. Two of the chief religions of my world, Christianity and Islam, never appeared at all. Instead we have Mithraism, Odinism, and Soterism, the last an Egypto-Hellenic synthesis founded by that fiery Egyptian prophet whose followers call him by the Greek word for "savior."

Still, Classical history followed the same *general* course that it had in my world, even though the actors bore other names. The Roman Empire broke up, as it did in my world, though the details are all different, with a Hunnish emperor ruling in Rome and a Gothic one in Antioch.

It is after the fall of the Roman Empire that profound differences appear. In my world there was a revival of learning that began about nine hundred years ago, followed by a scientific revolution beginning four centuries later. In your history the revival of learning was centuries later, and the scientific revolution has hardly begun. Failure to develop the compass and the full-rigged ship resulted in North America's—I mean Hesperia's—being discovered and settled via the northern route, by way of Iceland, and more slowly than in my world. Failure to invent the gun meant that the natives of Hesperia were not swept aside by the invading Europeans, but held their own against them and gradually learned their arts of iron-working, weaving, cereal-growing, and the like. Now most of the European settlements have been assimilated, though the ruling families of the Abnakis and Mohegans frequently have blue eyes and still call themselves by names like "Sven" and "Eric."

I was eager to get hold of a work by Aristotle, to see what effect I had had on him and to try to relate this effect to the subsequent course of history. From allusions in some of the works in this library I gathered that many of his writings had come down to modern times, though the titles all seemed different from those of his surviving works in my world. The only actual samples of his writings in the library were three essays, "Of Justice," "On Education," and "Of Passions and Anger." None of these showed my influence.

I had struggled through most of the Sachim's collection when I found the key I was looking for. This was an Iberic translation of "Lives of the Great Philosophers," by one Diomedes of Mazaka. I never heard of Diomedes in the literary history of my own world, and perhaps he never existed. Anyway, he had a long chapter on Aristotle, in which appears the following section:

> Now Aristotle, during his sojourn at Mitylene, had been an assiduous student of natural sciences. He had planned, according to Timotheus, a series of works which should correct the errors of Empedokles, Demokritos, and others of his predecessors. But after he had removed to Macedonia and busied himself with the education of Alexander, there one day appeared before him a traveler, Sandos of Palibothra, a mighty philosopher of India. The Indian ridiculed Aristotle's attempts at scientific research, saying that in his land these investigations had gone far beyond anything the Hellenes had attempted, and the Indians were still a long way from arriving at satisfactory explanations of the universe. Moreover he asserted that no real progress could be made in natural philosophy unless the Hellenes abandoned their disdain for physical labor and undertook exhaustive experiments with mechanical devices of the sort which cunning Egyptian and Asiatic craftsmen make.
>
> King Philip, hearing of the presence of this stranger in his land and fearing lest he be a spy sent by some foreign power to harm or corrupt the young prince, came with soldiers to arrest him. But when he demanded that Sandos accompany him back to Pella, the latter struck dead with thunderbolts all the king's soldiers that were with him. Then, it is said, mounting into his chariot drawn by winged gryphons, he flew off in the direction of India. But other authorities say that the man who came to arrest Sandos was Antipatros, the regent, and that Sandos cast darkness before the eyes of Antipatros and Aristotle, and when they recovered he had vanished.
>
> Aristotle, reproached by the king for harboring so dangerous a visitor and shocked by the sanguinary ending of the Indian's visit, resolved to have no more to do with the sciences. For, as he explains in his celebrated treatise "On the Folly of Natural Science," there are three reasons why no good Hellene should trouble his mind with such mat-

> ters. One is that the number of facts which must be mastered before sound theories are possible is so vast that if all the Hellenes did nothing else for centuries, they would still not gather the amount of data required. The task is therefore futile. Secondly, experiments and mechanical inventions are necessary to progress in science, and such work, though all very well for slavish Asiatics, who have a natural bent for it, is beneath the dignity of a Hellenic gentleman. And lastly, some of the barbarians have already surpassed the Hellenes in this activity, wherefore it ill becomes the Hellenes to compete with their inferiors in skills at which the latter have an inborn advantage. They should rather cultivate personal rectitude, patriotic valor, political rationality, and aesthetic sensitivity, leaving to the barbarians such artificial aids to the good and virtuous life as are provided by scientific discoveries.

This was it, all right. The author had gotten some of his facts wrong, but that was to be expected from an ancient historian.

So! My teachings had been too successful. I had so well shattered the naïve self-confidence of the Hellenic philosophers as to discourage them from going on with science at all. I should have remembered that glittering theories and sweeping generalizations, even when wrong, are the frosting on the cake; they are the carrot that makes the donkey go. The possibility of pronouncing such universals is the stimulus that keeps many scientists grinding away, year after year, at the accumulation of facts, even seemingly dull and trivial facts. If ancient scientists had realized how much laborious fact-finding lay ahead of them before sound theories would become possible, they would have been so appalled as to drop science altogether. And that is just what happened.

The sharpest irony of all was that I had placed myself where I could not undo my handiwork. If I had ended up in a scientifically advanced world, and did not like what I found, I might have built another time machine, gone back, and somehow warned myself of the mistake lying in wait for me. But such a project is out of the question in a backward world like this one, where seamless columbium tubing, for instance, is not even thought of. All I proved by my disastrous adventure is that space-time has a negative curvature, and who in this world cares about that?

You recall, when you were last here, asking me the meaning of a motto in my native language on the wall of my cell. I said I would tell you in connection with my whole fantastic story. The motto says: "Leave Well Enough Alone," and I wish I had.

Cordially yours,

Sherman Weaver.

THE END

THE DREAD TOMATO ADDICTION

BY MARK CLIFTON

You must agree that the conclusions reached are perfectly logical . . . even if somewhat peculiar.

NINETY-TWO point four per cent of juvenile delinquents have eaten tomatoes.

Eighty-seven point one per cent of the adult criminals in penitentiaries throughout the United States have eaten tomatoes.

Informers reliably inform that of all known American Communists, ninety-two point three per cent have eaten tomatoes.

Eighty-four per cent of all people killed in automobile accidents during the year 1954 had eaten tomatoes.

Those who object to singling out specific groups for statistical proofs require measurements within a total. Of those people born before the year 1800, regardless of race, color, creed or caste, and known to have eaten tomatoes, there has been one hundred per cent mortality!

In spite of their dread addiction, a few tomato eaters born between 1800 and 1850 still manage to survive, but the clinical picture is poor—their bones are brittle, their movements feeble, their skin seamed and wrinkled, their eyesight failing, hair falling, and frequently they have lost all their teeth.

Those born between 1850 and 1900 number somewhat more survivors, but the overt signs of the addiction's dread effects differ not in kind but only in degree of deterioration. Prognostication is not hopeful.

Exhaustive experiment shows that

when tomatoes are withheld from an addict, invariably his cravings will cause him to turn to substitutes—such as oranges, or steak and potatoes. If both tomatoes and all substitutes are persistently withheld—death invariably results within a short time!

The skeptic of aprocryphal statistics, or the stubborn noncomformist who will not accept the clearly proved conclusions of others may conduct his own experiment.

Obtain two dozen tomatoes—they may actually be purchased within a block of some high schools, or discovered growing in a respected neighbor's back yard!—crush them to a pulp in exactly the state they would have if introduced into the stomach, pour the vile juice and pulp into a bowl, and place a goldfish therein. Within minutes the goldfish will be dead!

Those who argue that what affects a goldfish might not apply to a human being may, at their own choice, wish to conduct a direct experiment by fully immersing a live human head* into the mixture for a full five minutes.

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* It is suggested that best results will be obtained by using an experimental subject who is thoroughly familiar with and frequently uses the logic methods demonstrated herein, such as:

(a) The average politican. Extremely unavailable to the average citizen except during the short open season before election.

(b) The advertising copywriter. Extremely wary and hard to catch due to his experience with many lawsuits for fraudulent claims.

(c) The dedicated moralist. Extremely plentiful in supply, and the experimenter might even obtain a bounty on each from a grateful community.

THE END

THE ANALYTICAL LABORATORY

The October issue, because of long items, contained only four stories; the scoreboard below shows how your votes went. One thing surprised me on this, incidentally—which is another way of saying: "Well, I guessed wrong on that one!"—the fourth-place rating of "Gentlemen: Please Note." I liked that one myself; a number of my friends who are in professional laboratory research liked it—because it is so darned true to life as it is lived in a standard lab! Oh, well . . . that's what we run this department for! You let me know what you want, and I'll try to get it . . .

OCTOBER ISSUE

PLACE	STORY	AUTHOR	POINTS
1.	Citizen of the Galaxy (Pt. II)	Robert A. Heinlein	1.62
2.	The Grandfathers' War	Murray Leinster	2.00
3.	Compensation	Christopher Anvil	3.05
4.	Gentlemen: Please Note	Randall Garrett	3.42

THE EDITOR.

HOT WATER

BY JON STOPA

The danger of international war with nuclear weapons is obvious. But there's something even less manageable just up ahead, around the corner....

Illustrated by Martinez

DAVID BURNS crumpled the teletype in a thick angry fist, saying loudly: "I don't get it." He was a short, stocky man with thick closely-cut brown hair, and the deep burnt-red tan that comes with skiing under the hot spring sun. As water-shed inspector for the city of Denver he had ample excuse to be on ski all day long—if in truth he needed even the slightest excuse. "Why should we close the tunnel?"

The chief engineer sitting at the teletype machine turned around and faced Burns, exhaling loudly through thick pursed lips. He was an older man, blond hair long ago fading into white, with the kind of skin that won't tan, but only turns raw meat red. "This might give you half an answer to shoot at," he said. "They've been getting radioactive water down below, and they can't close off until we do. It's signed Commissioner, Denver Water Authority."

"Danton?" said Burns. A thin sliver of white teeth was showing against his tan face as he bit his lip.

"Danton."

Burns felt a tingle of fear wobble up and down his spine, not so much over the thought of radioactivity in the water tunnel, but more at the thought of the possibility of Danton coming up from Denver. Danton had a horrible knack for making people, and him in particular, feel inferior. With growing suspicion he said, "Danton's not coming up, is he?"

"He sure is," said Johnson, standing up, letting the swivel chair spring back around, going *thunk, thunk,* until it came to a rest facing the machine once more. "He should be here any minute, he's coming by jet. You'll have to pick him up."

"Hah," Burns snorted. "Where does he think he's going to land? The closest field, that'll take a jet, is in Denver, and he's already there!"

"Hah, yourself," said Johnson. "He's going to land on Lake Dillon."

"Oh," said Burns, feeling about six inches shorter. Why he opened his mouth in such a way that his foot fit in it exactly, he did not know. And when he got down to it, he was not exactly sure that he wanted to know. "Hey, do you think that this is serious?"

"I don't know. How serious do you think radioactivity in the drinking water is?" The blood ran out of Johnson's face, leaving pink burnt skin behind. He was trembling slightly.

Burns squeezed his eyes shut. There it was again; foot in mouth. He seemed to be setting himself up just so he could be kicked down better than ever, this morning. Then slowly the realization of what had happened became alive in his skull, and he said: "What the devil are we standing here for? Call the valve room and tell them to shut it off!"

Johnson opened his mouth, taking a deep breath. It hung open for a moment, then snapped shut with an audible click. He walked unsteadily over to his desk and sat down, burying his head in his hands.

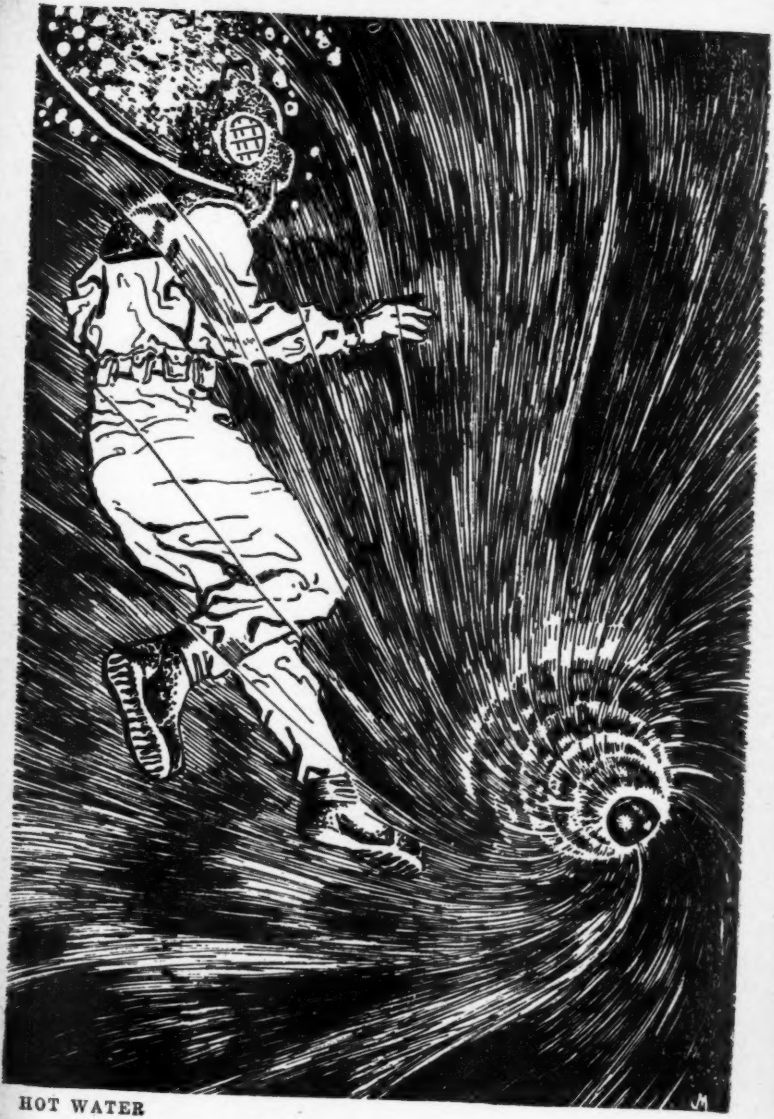
"Nobody is there," he said, voice muffled, "only a watchman—"

"Hey, it's not your fault—" said Burns, taking a step towards the old man. Johnson stirred slightly, but didn't say anything. The surge of sympathy that flowed through Burns was cut short as he remembered the valve that had to be shut off. Johnson would have to take the shock by himself.

Wordlessly Burns turned and ran for the door.

Burns watched impatiently as the amphibian circled, a flashing silver fleck in hard blue sky, then slowly settled down towards Lake Dillon. Far across the lake the white peaks of the Colorado Rockies formed a backdrop for the snow-covered valley floor. A brisk wind was blowing off the lake, sending little wavelets smacking crisply against the base of the dam at his feet.

The dam was a strange thing, here in the middle of nowhere, collecting water from melting snow in the spring, and rain the remainder of the year. Being on the western slope of the Continental Divide it caught every drop of water that was squeezed out of the moist west winds as they climbed the high passes and then dropped parched on the other side. The city of Denver, from its place on the dry eastern slope of the Divide, had always looked longingly at all that water, so near in space, yet so far in reality.



HOT WATER

The solution was simple, but breath-taking in conception: a tunnel twenty-six miles long, and ten feet in diameter was cut through the living rock of the Divide. Through that tunnel flowed the one substance for which man has found no substitute: *water.*

The plane roared briefly and low overhead, then dwindled in the distance as it touched the water and half disappeared in the misty white spray in its wake. Burns sheltered his face briefly as a gust of offshore wind carried a cloud of spray to his position on the dam.

As the plane finally managed to lose its momentum, and began taxiing back to the dam, Burns' attention wandered back to the lake. In a rather bemused mood he stared, trying to remember what it looked like below the surface. He had gone swimming down there with his aqua lung, through the empty streets, between the dead houses. The town of Dillon had been inundated when the dam had been built, and every so often a bit of it would be found after a big storm, washing against the wave-battered beaches—a piece of old furniture, a few water-logged planks, an old ship-in-a-bottle that somehow had managed to stay airtight; like ghosts that keep coming back to the scene of the murder.

A few feet away from the dock the plane's jets died, and it bumped gently against the wood bumpers, slowly floating outward again. A forward hatch opened, and a crewman tossed a heavy line to the dam. A dock hand grabbed it and quickly wound it securely. Danton's wide frame filled the hatch a minute later, Burns giving him a hand to the dock. The Water Authority Commissioner was a dark man, with black hair, and his skin had turned almost as black under the spring sun.

"Well," said Burns, "elaborate. What gives?"

Danton shrugged a massive shoulder, saying: "We'd better not speak here. Where's your car?"

Burns opened his mouth to protest that there was no one around except men that he had known all of his life, then closed it helplessly. Once Danton had made up his mind, there was no changing it.

"O.K.," said Burns, as he drove the car out of the parking lot onto the steep road that led to the base of the dam, "What's going on?"

Danton sat silently for a moment as the car descended the ice-covered road. Here in the shadow of the dam spring had not come yet. "Have you checked this car to see if it is bugged?" he said finally.

"Bugged? What do you mean, bugged?" asked Burns, getting tired of theatrics. "Who would want to listen to us?"

Danton's reply was stronger and more biting because he put it casually. "The same person or persons that sent a bomb down the tunnel."

Burns felt his hands grip the wheel with a grip that threatened to snap his finger bones. A weak "What?" was all he could manage.

Somehow he managed to swerve down the last two hairpin turns and pull to a stop along the edge of the road. The snow was still piled several feet deep here. He exhaled loudly and leaned over the wheel with his eyes closed. "You shouldn't say things like that when I'm driving." He hesitated for a moment, then said "What kind of bomb—fission or fusion?" Even he knew the difference.

Danton shrugged in answer: "Who knows? It's stuck somewhere between here and the other end—all we know is that it is atomic. We've been getting uranium hydroxide in the water for the last couple of hours."

"What are you doing with it? You aren't pumping it into the city water supply, are you?"

A wide grin slipped over Danton's mouth. "There's no worry there. If we hadn't been taking a very careful analysis of the water as it comes out of the tunnel, we probably would never have noticed it."

Burns sat back, exhaling. "How do you know that it's a bomb. It might just be ore from some deposit up here."

Danton shook his massive head. "Not a chance. The stuff in the water is U-235. If it were an ore, it would be almost all U-238."

Burns pulled his eyes back to the road and fell silent. He was glad that someone else was going to have to do all the worrying. He had been the outdoor type ever since he had been an inch high, and his knowledge of atomic physics was of the strictly Sunday supplement variety.

A Thunderbird stationwagon pulled out of the Administration Building parking lot and pulled over, waiting for them. Burns rolled down the window on his side and said to Johnson in the other car: "Where're you going? We're going to need you."

Johnson stuck his head out of his window. His face was pale and drawn. "Just got a call—F.B.I. is sending a few of its agents. I'm stopping off at my place to get some records and equipment before I pick them up." He drew his head back, kicked the stationwagon into reverse, and turned around, heading down the valley towards New Dillon.

Burns rolled up the window. In the shade of the dam it was chilly. Starting the car again, he rolled the last few feet into the lot, parking as close to the doors as he could.

He opened his door and stepped out. "Watch out for the ice," he warned, as he himself stepped on a slick spot and caught himself after a wild flurry of hands.

The solid glass doors that fronted the parking lot were quite impractical in a climate where the temperature regularly dove below zero every night late into April. They were just about to enter when their heads were snapped upward by a sudden clap of thunder. The long needle of a jet appeared over the lip of the dam, where the jutting white mass almost bisected the brilliantly blue sky, and flashed overhead. It circled once, cleaving the blue and leaving behind a virgin white vapor trail, occasionally dazzling them with a beam of reflected sunlight. Circling again, it lost itself against the distant mountains, then squirted back several hundred feet above the valley floor, its thunder splatting at them as it flicked overhead and disappeared over the dam. Suddenly it was quiet, but for the echoes that returned spasmodically from distant canyons and hillsides where they had been momentarily trapped.

"Looked like an Air Command job," said Burns.

"Yes," said Danton, pushing through the door. "I'll bet that's your F.B.I. now."

"Looks like they have to wait, what with Johnson stopping off at home," said Burns as he followed.

The room was thick with rolled balls of paper that long ago had bounced off the stuffed wastebasket, and dust covered everything with a gray film. Danton wrinkled his nose with disdain. "Doesn't he ever get around to cleaning these old conference rooms?"

Burns shrugged. "Johnson's been busy trying to get that old silver mine going. I think he feels guilty; he's spent quite a bit of time there."

"He did look sort of shot. *Phew,* when did they use this thing last?" said Danton.

Burns reluctantly took out his hankerchief and dirtied it by dusting the table and a few chairs. "Well," he said, "this ought to do. I doubt that this place has been used since the dam was built. Johnson tells me that they used it to relocate the people that had lived in Dillon before the dam was built over it."

"That was a bit before my time," said Danton. "Whatever happened to them?" He eased himself into a chair.

"Oh," said Burns as he pulled one up for himself and sat down, "most of them settled down the valley a bit—in fact a good number of them work on the dam as maintenance men. You know, Johnson himself used to live in old Dillon."

"Good, we'll have at least a minimum number of men we can trust," said Danton. He groped for a pencil and started twisting it idly with his fingers. Finally he said: "If we knew who put the bomb in there, we might have some vague idea of what sort of fuse it had. For instance, it can be calculated psychologically that Russia would use a time fuse in a situation like this—Argentina a pressure fuse."

Burns closed his eyes for a moment and tried to visualize what was happening all over the world. Civil Defense was alerting local authorities to mass evacuations, while state and national police instituted house-to-house searches for concealed bombs. There was only one kind of bomb they were interested in—and it left telltale traces that a blind man could find if he had a radiation counter. ICBMs were fueled and waiting for their course tapes to be inserted. The technicians were waiting for the target to be selected; so were thousands of fighters, bombers and interceptors on airfields spread over the face of the Earth. Their pilots sat waiting. Under rotating radar dishes watches were cut in half to reduce fatigue, and the number of men on each watch were doubled. But that didn't solve their problem here.

"I—" said Burns, sitting forward in his chair, about to suggest they ring for coffee. He was cut off when the doorbell sounded softly.

The door opened and a tall, well-built man of around thirty came in. A smile perpetually seemed to be about to form in the corners of his mouth, but it never managed to pull itself free of the official efficiency that modulated his personality. At first glance the most striking thing about him was the lowland pallor that made his face and hands appear white and drained of blood. It took a moment's reflection to realize that he was untanned—not ill.

"Mr. Danton," he said, shoving his hand forward, "I'm Dan Ross, F.B.I. They told me up front that I'd find you here."

Danton nodded and responded in kind, introducing Burns. "Where's Johnson?" he said, after the agent had been seated.

"Johnson?" said Ross blankly. "Oh, the fellow that was supposed to pick me up. He wasn't there, so I had one of the men at the dock drive me down."

"That's funny," said Danton, turning to Burns. "You'd better take an outside phone and check at his home."

Burns nodded and stood up. He left the room feeling both relieved and anguished at the same time. His fear of the responsibility that had been thrust at him was relieved with the remoteness of its agents, but his puzzlement, and therefore apprehension, over Johnson more than filled the void. The man was taking it too hard, *much* too hard.

He slipped into an unoccupied office and dialed Johnson's number.

"Yes?" The voice was strange at first, then he recognized it as belonging to one of Johnson's neighbors.

"May I talk to Mr. Johnson, please?"

"He's not home. Can I take a message?"

Burns thought for a while. "Yes," he said. "Tell him to call back at the dam." What the devil was going on?

He hung up and walked back to the conference room in a half dazed condition. The shock of the bomb's discovery had been enough to send him looping, now he was afraid that it had sent Johnson into a spin.

He almost felt better back with Danton. Here at least he could let someone else worry.

Danton listened to his report, then said: "You'd better go and find out what is going on, but be back soon. The A.E.C. is flying in a new neutrino detector from California."

Burns was about to turn and start for the door when a thought occurred to him. "Did you say new?

I thought that we had those for years—" He stopped, amazed at his own audacity.

Danton frowned slightly in disdain and dismissed the point with a wave of his hand. "Yes," he said, "but this is the first one that will allow us to zero-in on a point source through that much rock. This one's only an experimental deal—but they're working like the devil to get more for the general searches."

"I thought that neutrinos go through the Earth like light through glass, only better. Why should a little rock make any difference?" Burns went ahead, but he was already sorry that he had.

"The rock is not what makes the difference," explained Danton as he would to a child. "It's the distance from the source that gives us our trouble."

Burns cringed and shut his mouth.

The dark man turned back to Ross and said: "Once we find out exactly where it it is we'll be able to plan the next step on a bit firmer ground. It might be that the bomb is right near the top, or even just outside of the intake. It can't be very far away, or we would never be getting enough radioactivity to detect it with the most exhaustive analysis. At any rate, we have to know a bit more of its actual condition—we can't waste much more time."

Without thinking Burns said: "Why not use divers—or better yet, one of those undersea TV cameras—" Suddenly realizing that he was talking out loud he stopped and turned towards the door, expecting another blast of disdain. But Danton didn't even turn.

"I think we will," he said.

Burns took his chance to escape and slipped out the door.

The town of New Dillon was set away from the main road in a little valley several miles west of the dam, and was surrounded on the north and south by high mountains, on the west by a high pass that was only opened after the snows had gone, and on the east by a narrow gap in the main valley's wall.

He drove across the bridge that cut diagonally across the wide river that flowed through the valley's mouth, and into New Dillon. Stopping for the lone stoplight in the middle of the business section, he tried to relax, but his adrenal glands wouldn't let him.

Finally the light changed, and he was able to use a bit of the surplus energy in jamming down on the accelerator. The streets were deserted, he had hardly passed more than a half dozen souls, and half of those were children.

He turned the corner on Johnson's street and found out where most of the population had gone. The town hall was packed, with people crowded around the doors, and in some cases, the open windows. Evidently the news must have gotten out.

A block and a half later he swerved to the curb, or rather, to the edge of the pavement, and slid quickly from beneath the wheel.

Johnson's home was a low sprawling log cabin affair, with artificial log siding. Typical of many dwellings built in national parks where real logs have to be shipped in. A small automated brick factory where Johnson had spent his spare time before he got interested in the mine was in the backyard.

He ran across the slush and snow on the lawn and jumped over the margin of slowly advancing mud that surrounded the porch. For a minute or two he stood shifting his weight from foot to foot as he leaned on the doorbell, then a pale, drawn faced young woman came to the door.

"Miss Johnson," he said, "I would like to speak to your father, please."

The woman's face turned white, and she sagged against the open door. "He . . . he's at the town meeting."

He grabbed her before she fainted, carried her into the living room and laid her on the couch.

Burns parked his car in the only space left, the middle of the street, leaving the motor running. He leaped over the bumpers of the cars parked along the curb and ran up the town hall steps.

An armed guard stepped out from behind a column, blocking his way. "You can't go in there, buddy. This is a closed meeting."

Burns stopped, eying the shotgun in the man's hands. A voice rumbled in the hall, the words staying in, only the sounds passing the door. Indecision ached in his stomach.

Finally he said: "I've got to see Johnson—United States business."

The guard stood for a moment biting his lip, then he took a phone out of one of the columns and spoke a few words. The voice in the hall stopped.

The guard turned back to him and asked: "What did you say your name was?"

"David Burns," said Burns, wanting to say that he hadn't given his name before, but decided not to risk offending the guard.

Five minutes later the crowd around the door parted and Johnson came through. "Well?" he said, wasting no time. His face was still pale beneath the burn, and for the first time Burns noticed deep lines etched in the skin around the eyes.

"What's going on here?" asked Burns.

Johnson was silent for a moment, then he said: "Civil defense." His voice was tight, and it had an almost senile crack to it.

Burns put a friendly hand on the old man's shoulder. "Why don't you take a rest? Don't bother coming back to the dam. I can take care of everything."

Johnson's face relaxed long enough to flash a warm smile. "Thanks," he said, then turned and walked back into the hall.

The neutrino detector was standing in a van in the parking lot when he returned to the dam. Burns left his car and walked over to where

Danton was standing and talking to the men that arrived with it. Gray uniformed national policemen were swarming over the grounds, and he had to prove his identity several times.

Danton turned away from where Ross, the F.B.I. agent was arguing with a bulky police captain, and said: "Well, where is Johnson?"

"He got tangled up in the Civil Defense business — besides, he's pretty well shot. He'd be more of a drag, then anything, and I told him to go home and take it easy."

Danton thought for a moment, then nodded. "I suppose we can do without him. The office personnel can find all the records we need."

"How is the investigation going?" asked Burns.

"Fair, fair." Danton gestured at the F.B.I. and the policeman still arguing behind his back. "If they could settle jurisdiction, it probably would go faster."

Burns felt frustration liquefy his muscles, even though it was not directly his problem. "Why don't you define it, that thing is sitting down there, and *it* won't wait for Washington to make up its mind."

"That's an idea. I tell you what, in the meantime you take care of the AEC. I briefed them before, and you shouldn't have any trouble."

Burns licked his lips, and thought for a moment. "You've checked around the dam?"

"Yes. It's some place deeper in the tunnel, and we need a larger angle to give an exact location. Here's a map of the road to scale. It'll be dark soon, and you'd better drive. You know the roads better."

Burns turned and walked towards the waiting truck. He opened the cab door and slid behind the wheel. The man sitting on the other end of the seat reached out with his hand, saying "Hi, Carver's the name." He had a thin, pinched looking untanned face.

Burns awkwardly bent his right arm back and shook hands. "Burns," he said.

Carver shook his head and said: "Sorry to put you to all this trouble, but if somebody had thought of giving us accurate maps we could have taken our readings on the way up here."

Burns nodded and turned on the ignition. The motor turned over. He waved to Danton who was still talking with the F.B.I. agent and the national police captain, then threw the truck into reverse. "I thought that you were coming in by plane."

"We did," said Carver, "but someone slipped up and sent us in on a nonamphibious transport and we had to land in Denver."

"Well, at least we're not the only ones to have goofed off," said Burns.

"Easy," said Carver as they pulled out of the parking lot, "the thing back there is delicate."

The window between the cab and the box opened and a white bald head was poked through. "You bet it is," it said, "and so am I."

Carver laughed. "This is Peters,"

he said. "He does the mad-scientisting around here."

Peters growled slightly. "Go on," he said, "work off your inferiority complex on me." He slammed the window.

Burns managed a small snicker. It hit too close to home to be funny.

They had gone about ten miles, and were about to make the final climb for the pass, when the window opened again and Peters stuck his head through. "That's far enough, there should be enough of an angle for me to get a reading."

Burns took out the map and unrolled it carefully. Matching it to the road, he indicated their position with a neat, precise little X. Passing it back, he said: "Here, this'll tell you where we are."

The window closed and he sat back, losing some of the tension that had been building up since morning. He took out a pack of cigarettes and offered one to Carver.

"Thanks, I can use one." Carver's pinched face cracked and split into a thin grin.

The two men sat smoking in silence, watching the sun's light fade on the mountains before them. The valley fell into shadow and the snow-covered peaks shaded from hard white to warm gold.

"What are those?" asked Carver, pointing down to a group of deserted buildings on the valley floor.

Burns looked. "Those were put up to take care of the people evicted from Dillon by the city. They weren't built very well, and there was a big stink when one of them collapsed under the weight of a heavy snow. Most of the townspeople were quite angry with being evicted from Dillon in the first place when the dam was built, and this darn near caused a riot."

"Where are the people now?"

"Oh, most of them have been resettled in New Dillon. That's the big joke, though. They're going to have to move again soon, since the city finds that it doesn't collect enough water with the Dillon Dam, and will have to put up another dam where New Dillon is."

"They're in a regular rat race." Carver chuckled without opening his mouth.

Burns shrugged. "The city needs the water. It's the welfare of almost a million people against the convenience of fifteen hundred."

The window opened and Peters stuck his head through. "Let's get going, I've got it zeroed in. It's as Danton thought — almost halfway down.

"Move over, I'm coming up front, it's cramped back here."

Danton was waiting for them when they got back. Burns pulled into the parking lot and came to a stop where he was standing. The three of them piled out of the cab.

"Here," said Burns, handing him the map, "you were right, it's about halfway down."

Danton sighed. "I was afraid of that. Usually when I expect something bad I don't get it. Oh well, it could have been worse; it could have been all the way down at the bottom. We couldn't wait for you to come back, and he's down there already."

"Who?" asked Burns.

Danton unrolled the map and tried to read it in the light of a distant floodlight. There was no moon, and the stars were as thick as weeds in the sky. "Oh, I guess they came after you left. The navy brought a diver and an electric cart. He's in the tunnel now, about nine miles down."

He gave up trying to read, and the two men started towards the glass doors. Carver and Peters had already climbed back into their truck and were heading towards Denver. Right now their equipment was badly needed elsewhere in the general search.

Burns followed Danton into the building and on into the valve room. "You haven't looked at the map yet, but when we said halfway down, we were talking loosely. As accurately as we can tell, it actually is ten miles and seventy-five feet."

"You could have told me a little before this," Danton bit out.

Burns shrugged helplessly: while Danton turned and walked over to where a group of technicians were working around several machines. The pipe that carried water from the dam to the tunnel was dismantled below the valve, and a thin black wire ran across the floor from a telephone, over the lip of the open pipe, and disappeared down the tunnel.

Danton talked for a while on the phone, then stopped when Ross, the F.B.I. agent, entered the room with a batch of papers under one arm.

Danton handed the phone to a technician and said: "Come up with anything?"

Ross patted the papers. "I think so, but the prints I sent to Washington should tell the story. I've gone over the records kept in the office, and they don't quite jibe with the automatic records in the different servo-mechs. Whoever the saboteur is, he has had access to almost everything."

"Mr. Danton," interrupted the technician, "he's reached the bomb."

Danton picked up the phone. "Yes? How close are you?"

"About thirty feet," answered the distant voice, *"I'm leaving the cart now and walking towards it."*

"What does it look like?"

"Hard to tell yet, from this distance it looks like a sphere about several feet in diameter. I'm almost up to it," he added.

Danton turned away from the phone for a moment, saying "It's round, they must have let water pressure roll it down."

He turned back as the voice continued: *"I can see where you get the radioactivity. The thing smashed into a steel bar that was left from the laying of the cement, and both the casing and the tamping is split. I'm surprised I didn't hit one myself on the way down, but most of them have been much smaller than this one."*

"Is there any danger of it going off?" asked Danton.

"Not much, if water has leaked into the inner part, the masses will not be able to be brought together fast enough to form an explosion."

"You'd better defuse it, anyhow," said Danton.

The navy man was quiet for a moment or two, then he said: *"It's a good thing that you didn't let the water out of here, this thing looks like it was set to go off when the pressure returned to one atmosphere."*

Danton grunted, and the redness faded beneath his tan. He had been very seriously thinking of just that. "Have you got it deactivated yet?"

"Not yet, I have to roll it over

before I can get good access to the fuse."

A gray-uniformed police captain burst into the room, disrupting the conversation. "Mr. Danton," he half shouted, "my cars have been shot at—"

"Easy, easy," said Danton, taking the breathless man and sitting him down on the edge of the open pipe. "Now what is it?"

It was a minute or two before the captain could speak coherently. "I sent some cars to New Dillon to check on a few names, but they never got that far. You know that bridge just before you get into that side valley? Well, there was a road block right in the middle of it."

Fully in possession of himself once more he stood up. "Naturally they got out and started to take it down. They had no sooner pulled the first log over to the railing, when one of them noticed this"—he waved a slip of paper at them—"and someone started shooting at them."

Danton took the paper from the policeman's hand and started reading it. He had gone no more than a few lines when his face went blank and his hands fell to his side. "What the devil?"

Burns looked at him for a moment, then reached down and took the paper from Danton's limp hand and started reading it himself. From the very first words it sounded vaguely familiar—

. . . Course of human events, it becomes necessary for one people to dissolve the political bonds which have connected them with another . . .

Of course! It was the Declaration of Independence.

Ten miles away a hand holding an aluminium sheathed sphere away from an iron bar slipped, and the sphere rolled down the slope of the tunnel, pulling the man's other hand out of the half-opened fuse mechanism. A relay closed, and the sphere, bar, and man no longer retained their individual solid state. They were part of a cloud of vaporized water, concrete, and rock that was expanding away from the point where the bomb had existed up until this instant.

The shock wave reached the dam several seconds later. The floor reached up and slapped Burns in the face.

Thousands of feet of rock, no longer supported solidly below, settled downward, squeezing the newly molten rock out through weak places in the crust. A tongue flowed downward through the emptied lower half of tunnel, another pushed upward, shoving the water ahead of it. Convection currents could not move fast enough to pull away the boiling water at the junction between the molten rock and the water, and so almost instantly the water passed the several stages in boiling—from the pin point, through the general, into the sheet boiling.

The shock of ice cold water flowing over his body woke Burns instantly. By the time he had struggled to his feet the water coming from the damaged valve was up to his knees.

The technicians were gone, and so was the police captain. Danton was half carrying, half dragging Ross, the F.B.I. agent towards the door. Burns stumbled after, giving as much help as he could.

The valve gave way completely just as they were almost to the door, and the water surged above their chests and flung them through.

"Come on," shouted Burns above the roar of the water as they climbed back to their feet, "let's get out of here before the walls go!"

A high pitched crash above pounding of water filled the air briefly as the pipe tore loose of its bracing. They struggled ten more feet before the lights shorted out.

Somehow the two men managed to stagger through the dark halls and out into the open carrying the unconscious agent. Atomic bombs exploding in tunnels have only a minute effect on the weather, and it was near zero when they finally pulled themselves away from the building.

"Is there any way to shut that thing off?" asked Danton as they tumbled, shivering, into Burns' car.

"There's a gate at the intake we might be able to shut," said Burns, as he spun the car around and sped out of the parking lot. Several inches of water flowed over the blacktop already.

By the time they climbed the switch backs and closed the intake, the molten rock was beginning to flow through the tunnel's mouth. Instantly the building was hidden in a cloud of steam, then a sheet of flame. Minutes later a column of steam and smoke was climbing towards the stars, high in the sky.

It was still there, more massive and solid, hours later when the sun started tinging its top pink. Burns looked past it towards the slowly brightening sky and shivered in the early morning cold.

He leaned over and turned the heater on. Danton looked at his watch again. "They should be here any minute now."

Burns leaned back sighing, carefully not closing his eyes. In roughly twenty-four hours his world had been turned upside down, and inside out: his best friend, a stranger; his values, nothing.

Danton turned on the radio, ran it through the AM, then the FM band, then the short wave. Interference cut across them all. He nodded to himself, grunting in a satisfied manner.

Overhead a half dozen jets swooped past again. Their sound lashed back and forth across the valley, finally dying to be replaced by a low rumble.

It drew closer and closer, until suddenly its source pulled around a snowbank and into sight. Four gray police tanks lumbered down the road, pulling to a stop as they came abreast of the car. The truck that carried the neutrino detector followed the tanks until they came to a stop, then it pulled over on the shoulder and parked in back of the car.

Burns and Danton climbed out into the cold air and met Peters between the two vehicles. The bald scientist was wrapped in a heavy coat and topped with a heavier fur cap. He spread a map of New Dillon on the trunk of Burns' car with numbed fingers and pointed to several points in the valley where he had drawn little X's. "These are all highly radioactive, but this one here," his finger stabbed at a larger X, "is obviously a mine."

"But that's Johnson's silver mine," said Burns.

Danton nodded. "It fits. It had to be Johnson. No one else could have juggled things in such a manner as to put that bomb into the tunnel undetected. The fingerprints all check, only men from Dillon were in that room."

The jets passed overhead again.

Danton headed towards the lead tank. "Let's go," he said.

Leaving the car and truck behind, the tanks drew up to the bridge below New Dillon twenty minutes later. The barricade was still standing in the middle of the span.

Burns and Danton climbed out of the tank and walked towards the middle of the bridge waving a white flag. A voice shouted: "Halt!" from some place across the river. They halted.

Ten minutes went by with nothing happening, then a car came down the road from the New Dillon side and pulled to a stop at the edge of the bridge. Johnson climbed out and slowly walked over to meet them.

"All right, Johnson," said Danton in his most overbearing tone of voice, "what is this nonsense all about?"

"You read what was on that declaration," answered Johnson coolly, "didn't you? We mean exactly that. We're seceding from the United States. We've been pushed around as much as we're going to be, and that's that."

Burns felt his head swim.

"You know we can't let you do that," shouted Danton.

Johnson shrugged. "How can you stop us? We're completely self-sufficient, and we probably could bomb your cities if we had to."

"What if we bomb you first?" asked Danton.

Johnson shrugged again. "You've probably noticed that we've got bombs planted all over our valley. The odds are pretty good that at least one of them would be detonated by the explosion. They're all hydrogen bombs, of course, and if one of them should go off the fallout, especially over Denver, should be something to behold."

"But—" sputtered Danton.

The corners of Johnson's mouth raised slightly in a smile, then dropped again. Without another word he turned and walked back to his car.

Twenty minutes later the tanks had returned to Burns' car again. "This should be far enough," said Danton as they climbed out.

"Far enough for what?" asked Burns as he dropped down to the ground.

"You'll see."

Peters came back from the truck with half a dozen pairs of goggles. "Here," he said, "you'd better put these on . . ."

A single jet bomber flashed overhead.

". . . Quick!" he finished.

Someone snapped a pair on Burns, he couldn't make his arms move. An instant later a new sun rose briefly in the west over New Dillon, and a familiar, horribly familiar, shaped cloud joined the accredited clouds of the sky.

After a minute or two they took off their goggles. Danton turned towards the truck, saying: "Well, that finishes that. I guess there really wasn't much chance of setting off one of their H-bombs, it was all bluff."

"It was a chance," said Peters, following.

"One we had to take," said Danton. "The very idea itself had to be killed."

Burns looked after Danton. Was it just an after-image, or was Danton's face pale? He turned back, looking at the cloud, and thinking of his friends that were part of it. Suddenly he understood something that he had never understood before —fear is anger unreturned, driven inward, and against one's self.

Danton was wrong, this crisis was not over, it was just beginning. Democracy occurs when a majority respects the rights of a minority—unfortunately, the majority rarely does so except when the minority can *make* it listen.

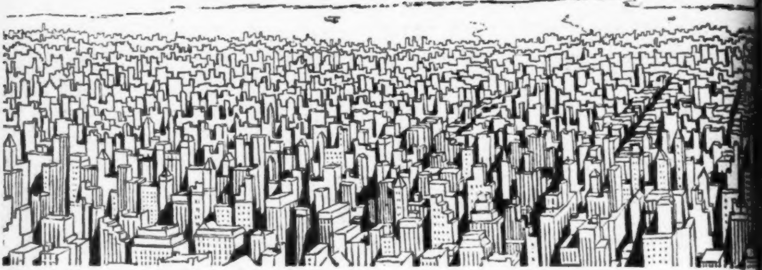
In many ages the balance of power between the individual and his community have been even—the days of the six-gun and the cowboy, for instance. But it had been a long time since then.

Burns turned and headed towards his car. He was afraid no longer, he was angry. Before, the weapon that created the balance of power had started in the hands of the individual, then the technique was adapted and used by the army—and what is one man against an army? But this time it was different, this time the weapon had started in the control of the army and fell into the control of the individual. And, just as before, when once the control shifted it never returned, it didn't seem likely that it would this time, either. Not when any man and his brother could build a bomb in his bathtub.

He slipped behind the wheel. There was a place nearby where a small vein of uranium ran through the earth. He looked once more at the cloud, the anger that had been long kindling deep in his belly sprang into hot flame. He was not sleepy now; he was more interested in getting to Denver and getting certain physics books from the library.

There were going to be a lot fewer armies around in a very short while.

THE END



NO WAY OUT

When the facts are what they are, a man has a choice of three conclusions: I must not. He won't let me. Or, It can't be. But no choice at all as to whether it will be or not....

BY ROBERT SILVERBERG

Illustrated by van Dongen

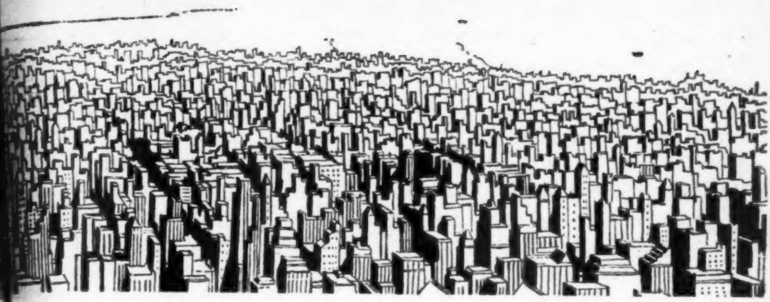
FOR Lester McClellan, Secretary General of the United Nations, it promised to be just another busy morning. Routine was a comforting cradle that kept him from feeling the strain of his weighty office.

He riffled his way through the accumulated mail the chute had deposited on his desk, then pushed the stack of papers to one side and reflectively drew a fingertip across the desk's dark, lustrous wooden surface. He was proud of the desk; not everyone rated real wood instead of formica or some other wood-imitation.

The wall clock showed 0917. The Outworld delegates were due to show up at 0930. A little tensely, McClellan forced his attention back to the morning mail.

Routine, he told himself. *It's just routine.*

But it wasn't just routine. That was what was troubling him. In thirteen minutes three smug Out-



worlders were due to come through his door, and then all his diplomatic skill, accumulated over years, would have to be brought into play.

He unfolded the pink slip from BuPop. The figure stood at 9,111,234,006. McClellan drew the previous day's slip from the desk and compared it; the computer was known to err, at least once every ten thousand days or so. But no error had been made this time. Yesterday's figure was 9,111,102,006. One hundred thirty-two thousand human beings had been added to the world's total population since the previous morning.

McClellan stared blankly at the BuPop info-slip, then slid it into the drawer. Next year—2180—was a Census year. Demographic techniques always improved considerably in each ten-year span; the census-takers would probably discover a couple of hundred millions who had been overlooked last time around. It was only to be expected.

On his desk also was a memo from Kingston, head of Research. It said simply: "Lester—I think we're getting close. Can you drop down to my office about 1630 this afternoon for a progress briefing?"

Kingston and his men were working on a faster-than-light drive: another of Earth's frantic attempts to dispose of its excess population. McClellan dictated an answering memo: "Tell Dr. Kingston that I'll be at his place at the hour requested, barring troubles."

Getting close, the memo said. McClellan wondered. By tonight, Kingston's project, once thought just a pipe dream, might be Earth's only hope. The stars—

The annunciator chimed.

"Yes?" McClellan said.

"Three gentlemen to see you, sir. Mr. Ludwig, Mr. Castellani, Mr. Rockwood."

McClellan glanced at the clock. Damned Outworlders were seven minutes early. Impulsively he jammed the rest of the mail in a desk drawer and said, "Send them in, please."

He straightened his tie, smoothed back his graying hair, fussed with his short clipped mustache. He took one last look at the memo from the Assembly instructing him as to the part he was to play in the negotiations.

("... You are to exert every means within your power to persuade the colonial visitors to reopen their worlds to immigration . . .")

He scowled fitfully, dumped the memo in the disposal chute, tugged briefly at his collar, and glanced up, calm and outwardly self-possessed, as the three Outworlders trooped into his office.

"Good morning, gentlemen."

They arrayed themselves in a tense little line on the carpeting before his desk. They looked uneasy; small wonder, McClellan thought. After all, the Outworlders were in the position of children who had refused to come to the aid of their aged parents in a time of need. No one likes to be open to a charge of filial ingratitude, even when he may have excellent reasons for holding his point of view.

"Won't you be seated?" McClellan said urbanely. He appraised the tone of his own voice: it was smooth, unwavering, even. He was pleased. Diplomacy was his job; he wanted to do it well.

The Outworlders moved gawkily toward the three chairs he indicated, and after finally settling themselves, leaned forward eagerly with hands placed uncomfortably on their knees.

McClellan glanced quizzically from one to the next until the man on the extreme right, a long-legged, pale man with deep-set and disconcerting eyes, said, "Permit me to make the introductions. Immediately to my right is Donato Castellani, Vice Prefect of Mars Central; to his right is Earl Ludwig, Third Chancellor of Callisto Colony."

"And I take it then that you're David Rockwood, Arch Secretary of Venus Mid?"

"Correct."

McClellan studied them. Castellani was short, pudgy, with sandy hair and a nearly-bridgeless nose; Ludwig's face seemed all cheekbones and planes. All three were dressed in traditional pinstripes, which struck the secretary general as mildly amusing, since no self-respecting Terran diplomat would wear anything so stereotyped. But these three, he reminded himself, were colonials—gauche, nervous, and very, very self-serious.

He assumed an air of complete relaxation to dismay them further. "As secretary general of the United Nations, I'm happy to welcome you back to the planet of your ancestors. Is this a first visit?"

"It is."

McClellan smiled. "You'll find Earth perhaps not so attractive as your native worlds, but I hope you won't be too critical of us. After all, we didn't have the advantage of the Terraforming process."

"Of course not," Rockwood said. He seemed to be the spokesman. His words were clipped, precise, and faintly alien-sounding. Obviously pronunciation had diverged from Earth-norm considerably in the four generations of the colonies' existence.

The time had come to end the more-or-less courteous preliminaries; McClellan said, "We're very happy that the Outworlds agreed to send observers. There's a major problem here and we think you can help us."

"If it's within our power to do so," Rockwood said.

"Naturally. I imagine you're thoroughly familiar with the text of the Assembly resolution inviting the three Outworlds to send observers to Earth?"

"We are."

"Good. I've arranged for you to have a guided tour of our planet—a brief tour, to be sure, but one that will amply illustrate our major problem. Which is, of course, overpopulation."

Castellani of Mars Central squinted at him. "At the conclusion of which tour, you're going to request us to open our planets for further colonization. Well, I think you ought to know—"

Rockwood jabbed the Martian swiftly and efficiently in his plump stomach with an elbow; it was a surreptitious gesture, but McClellan's quick eyes took it in. He smiled good-naturedly.

"The Assembly resolution," Rockwood said stiffly, "requests us to reserve our decision until we've seen Earth. Very well. We intend to abide by our agreement, and we'll take a look around."

Castellani looked abashed and crestfallen. McClellan let his eyelids droop briefly in a flickering concession to weariness. He had told the Assembly and the Council both that this mission was a waste of his time and of the Outworlders'. But the Assembly had passed the resolution and had implicity ordered the secretary general to persuade the Outworlders in some manner to admit Earth's ravening overflow.

(". . . exert every means . . .")

He moistened his lips and rose, digging his knuckles into the authentic wood of the desk. The Outworlders wouldn't be impressed by a wooden desktop—not when their pleasantly arboreal worlds boasted more trees per square mile than all of North America and—

"If you'd like to begin the tour now—" he said questioningly, and left the sentence unfinished.

"This is essentially a show-cause operation," McClellan remarked as he led them down the corridor to the liftshaft. "I mean in legal terms. You're requiring us to show cause why we should not be compelled to remain bottled up on Earth—and once that's done, you'll have to show cause why you should not admit us."

"It's curious to me," Ludwig said, "that Terran law should work on so many negative principles. A prosecutor, for example, is supposed to show cause why the defendant should not be found innocent." The Callistan shrugged. "You make needless verbal complications for yourselves."

"It amuses us," McClellan said. "Involutions appeal to our way of thinking."

They entered the liftshaft and spiraled downward to Sublevel 23. The first stop on McClellan's list was BuBop.

"We keep check on our population statistics from here," the secretary general commented, nudging open the door to the BuBop office. Douglass, the computer technician, looked up and regarded McClellan gravely.

"Good morning, Mr. McClellan."

"Hello, Douglass. These gentlemen are some friends of mine. I'd like them to have a look at the way BuBop functions."

"Sure. Go ahead."

BuPop was a mere cubicle, not more than fifteen feet square. Its walls were lined with screens bright with data; but the computers, were far below. McClellan gestured to the broad screen mounted in the wall opposite the door. A line of bold red figures marched across it, flickering and changing rapidly.

"There's the official record of Earth's population," he said. "Every birth and every death is automatically fed into the main computer channel as soon as it's known, and within two hours gets indicated up there."

He glanced at the figure. It was now 9,111,236,917. According to the 0900 slip, it had been down near 234,000 or so. Two thousand lives had been added to the roster since he had entered the office at 0900 . . . thirty-one minutes ago.

As they watched, the last three digits wavered and blurred; when the blurring ceased, some hundred units had been deleted. Now the screen read 9,111,236,823.

"What happened?" Rockwood asked.

"Death entries clogging up in the smaller comps. It happens sometimes; those computers are busy day and night. Just keep watching."

They watched. A flurry of births followed; within minutes, the total was climbing toward 9,111,237,000.

"Hardly a day goes by without at least a hundred fifty thousand units being added to the total," McClellan said. "Yesterday's was low; only 132,000. But as you can see our population keeps climbing steadily. It's an average gain of about a million a week, fifty million a year. Only there's compound interest involved in the increase, of course. Fifty years ago we were only gaining about thirty-nine million a year."

"You unloaded several billions setting up the colonies," Ludwig observed. "My own world, Callisto, still is thinly populated, but I know Mars has almost a billion, and Venus—"

"Total Outworld population is just above two billion," Rockwood informed.

McClellan nodded. "Opening up

the colonies helped. But with an increase-rate of fifty million and up per year, we'll have added another billion to Earth's population in less than two decades."

"What you need is an efficient plague," Castellani said. "Something that'll clear away three or four billions."

"Yes," McClellan said coldly. "Or an interplanetary war. That might do it."

For a few instants tension crackled in the BuPop cubicle. Then Ludwig broke the silence by gesturing to another screen.

"What's this?"

"Population distribution. We do our best to keep exploiting every bit of cultivatable land, and to keep population density roughly equal all over the globe. It's strictly a temporary expedient, of course."

"Of course."

"And this screen over here—"

The statistics were somewhat numbing, McClellan decided, as he finally shepherded the three emissaries away. In fifteen minutes more than a thousand units had been added to the total on the BuPop screen. The Outworlders were visibly uneasy, unhappy, out of sorts. Mere numbers had a stultifying effect. The next step was to show the Outworlders actuality.

The copter was waiting on the roof as scheduled. The pilot stood tensely at ease; he was a fidgety-looking man with the bleak, harried look of someone whose family lived in a Class Nine one-room "apartment." At McClellan's approach, he climbed into the cockpit and readied for a take-off.

"You'll be able to observe actual living conditions from here," McClellan said. The three Outworlders took seats in the copter's rear.

"This is New York," McClellan said, as the small craft sprang into the air. "Current population of New York City is about thirteen million. New York City is just a legal fiction, though, as you'll see. There's hardly any gradation between the five boroughs and the outlying suburbs."

The Outworlders peered down, frowned, twitched, whispered to each other. Below, New York unfolded itself, row on row on row of dwellings stretching in a dull gray-brown sheet to the horizon.

"The largest city on Mars has seven hundred thousand people," Castellani said.

"Callisto has no cities," commented Ludwig. "We discourage urban accumulation. Of course, with our relatively small area—"

McClellan remained silent, allowing the colonials to get a full view of the continent and receive maximum impact.

"Note the absence of trees," he remarked later, as they passed over New Jersey. "We have hardly any. Wood is a precious commodity on Earth—a luxury substance, you might say."

"One would wonder where you plan to put the billions you anticipate in coming years," Rockwood said.

"One *would* wonder indeed."

After a lag Ludwig asked, "How is the Terraforming of Titan and Ganymede coming along?"

"So far as I know it's nearly completed. Both worlds will be ready for colonization within five years," McClellan said. "But then we'll have run out of worlds to Terraform. Mercury's too hot; Pluto's too far out. The others are too big."

"There are more moons," Castellani observed. "Including your own."

"Yes," McClellan admitted dryly. "But moons tend to be small and barren, and not worth the billions it costs to Terraform them." He chuckled. "We could Terraform Deimos in ten years, at a cost of thirty billion dollars—but how much of our overflow will be absorbed by a moon five miles in diameter?"

"You've deliberately picked the smallest one!"

"Indeed. But even Luna could hardly hold more than eight or nine hundred million."

McClellan turned away and looked down. A spot of green appeared—some local sanctuary, no doubt. There still was grass and trees in various parts of America. But when the Parks Act ten years ago halved Yellowstone and Yosemite to provide more housing and more room for industry, Earth's parks had been doomed. He scowled and shook his head.

The pilot was following a carefully-plotted itinerary that would take him over the most thickly-populated sections of North America. McClellan listened to the steady throb of the jets and let his eyes be caught up by the unending grayness of the land below. The colonials seemed impressed—horrified, in fact.

Perhaps, he thought, the Assembly had been right; if you brought some colonials down here and let them see first-hand what sort of hive their mother world had become, perhaps they'd change their minds about the Exclusion Acts.

Perhaps. But McClellan wondered if it made any difference what the colonials were thinking. Mars and Venus and Callisto were only small worlds too, after all.

If only the big planets were available for Terraforming! But it was impossible. Saturn and Jupiter and Neptune simply were not fit for human existence, and no sort of tinkering with the atmosphere and soil chemistry was going to change that. It couldn't be done.

No. Humanity at present was limited to the three small inner worlds, Mars, Venus, Earth. Mercury was too close to the sun; present techniques couldn't cope with the dayside-nightside situation. Chemists could strip away Venus' cloud-layer and turn that formaldehyde-soaked world into a lovely imitation of Eighteenth-Century England, but there was no way of adjusting the solar constant or alleviating the pull of gravity.

Not yet.

They had traveled for hours; the Outworlders had seen mile on dismal mile of close-packed houses and factories. About noon, the copter hovered over the dark green waters of the Gulf of Mexico; the jets cut off and the rotors came into play.

"Are we going to land down there?" Ludwig asked.

"Yes. I'm taking you to a Food Station floating in the Gulf. You may find it instructive."

The copter came to rest on a broad landing apron attached to Food Station 117, a gleaming metal island drifting in the Gulf. McClellan gestured for the trio of Outworlders to step down.

"We have little cultivatable land left, and what we have won't produce enough food to feed our population. But there is one high-yield area now coming under intensive cultivation for the first time—and high time it is, since it's an area covering a good chunk of the planet. We're farming the sea."

A heavily-tanned man in overalls emerged from a blockhouse on the artificial island. He strode toward the little group, grinning.

"Secretary McClellan?"

"That's right. You're Haverstraw."

The man nodded. To the Outworlders, McClellan said, "Mr. Haverstraw is the engineer-in-charge at this station. He'll show you around. I'm pretty much . . . ah . . . at sea here, you know."

Haverstraw took charge. He guided the by-now weary-looking colonials over the entire sprawling bulk of the Food Station, showing them the fully-equipped lab, explaining how the chemical composition of the sea governed the food yield, discoursed on the importance of the phosphate index and deep-sea turbulence and the myriad of other nutrient factors he and his men watched over.

McClellan listened beamingly; most of this was as confusingly strange to him as it was to the Outworlders, but he knew the right idea was being conveyed: man on Earth was desperate for food and for living space. And the Outworlders, who reveled in their *lebensraum,* had a moral obligation to repeal the Exclusion Acts.

A drab-smocked technician appeared, bearing trays.

"These are plankton steaks," Haverstraw said. "Still in the developmental stage. The steaks are synthesized chiefly from copepods—small creatures, very much like near-microscopic shrimp. The bread at the side of each plate is baked from phytoplankton meal. Taste it."

They tasted. McClellan found the plankton foods nearly flavorless, and what little flavor there was was offensive. From the expression on their faces, it seemed the Outworlders felt the same way.

Haverstraw grinned. "Pretty punk, isn't it? We think so too. But it's awfully nutritious, and there's a darned near limitless supply. Which is more than we can say of animals, edible or otherwise."

"I've noticed that," Ludwig said.

"I've seen very few animals so far. How come?"

"We've discovered that a kind of Law of Conservation of Life holds true," McClellan said. "The quantity of living things on one planet remains fairly constant. And if one species—such as us—decides to spread over every square inch there is, the other species start vanishing."

"I see," Ludwig said gravely.

"Anyone care for more plankton steak?" Haverstraw asked.

McClellan winced. "I doubt it."

They returned to New York shortly afterward. The final demonstration was carefully calculated to be the *coup de grace;* the psychometrists had chortled long and hard over it when it left their drafting boards. The pilot let them off on the roof of a building in the heart of metropolitan New York. It was 1530; the afternoon rush was just about to get under way.

"Aren't we going back to the United Nations headquarters now?" Castellani asked, almost plaintively.

"Yes. The pilot's going to fly back; we get off here. We're taking the subway. It ought to be fun, just about this time of day."

It was and it wasn't. McClellan had never so enjoyed a subway ride in his life, watching the Outworlders' discomfiture. At least three hundred people were crammed into the capacity-two hundred subway car; with a fifty per cent overload, the car's air conditioning was utterly futile.

They emerged looking like somewhat dehydrated sardines. McClellan's nerves were quivering; he was sure the Outworlders were near collapse. But the demonstration was over. He led them to the liftshaft and proceeded swiftly with them to the relative solitude of his office.

"You have now seen Earth," he said. "I'll correct that: you've seen North America. Be assured that it's much worse in other places. Why, in Asia alone—"

"Please," Rockwood said wearily. "No more statistics. We're amply convinced. Whoever devised this little tour is a shrewd demon indeed."

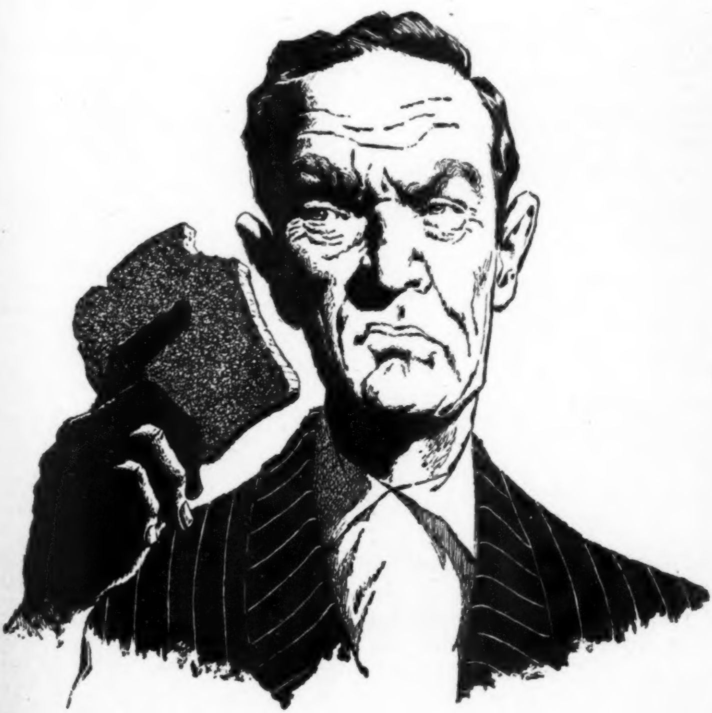
Castellani nodded. The plump man looked completely wilted. "You've made your point. Over and over again."

McClellan smiled in self-satisfaction. He had been of the private opinion that the tour as planned was a bit on the childish side, but he hadn't made formal objection. An Assembly resolution, after all, was an Assembly resolution.

"I suppose you're waiting for our decision now," Rockwood said. His sharp eyes flicked rapidly from McClellan to the shiny desk. "Let me review: When you people set up the three colony worlds about a hundred fifty years ago, it was with the proviso that the original group of volunteer colonists could be supplemented by further groups at annual intervals. During our first hundred years of existence this worked to our mutual benefit—the men who came were able to fit right into our program." He paused.

"Fifty years ago, we discovered we were reaching a maximal population —and it was then that we instituted the system of tests for prospective colonists. This reduced the flow—somewhat." Sadly, the Martian added, "It came to our attention, though, that the mother world was taking steps to circumvent our system of criteria. Furthermore, we had now reached the point where, rather than welcoming new colonists, we were more anxious to *control* increase than stimulate it. It became necessary to take legal measures if we were to have things our way. Therefore we passed acts in Congress revoking the immigration proviso of the original charters and prohibiting all further immigration from the mother world."

"Exactly," said McClellan hoarsely. "Whereupon the governing body of the mother world requested you to reconsider. For the past century



we've regarded the colonies as our one safety valve for overpopulation—but now that we need to use that valve we discovered it's shut down tight."

"We've seen Earth," Ludwig said. "We agree that it's a terrible, terrible situation. However—"

McClellan tensed. He feared what was coming, although he had expected it from the start.

"The population of Callisto," Ludwig went on, "is, at the moment, some four hundred million. This, for a world only a little over three thousand miles in diameter, approaches a maximal figure of comfort—inasmuch as our death rate is exceedingly low, thanks to the medical advances of the past century and the fine soil and atmosphere the Terraforming engineers provided. Naturally we have to keep careful watch over birth rates to maintain normal population distribution."

"The same is true of Venus," Rockwood said. "And, I assume, of Mars."

"Of course," said Castellani.

In the sudden silence McClellan felt unnerved; his composure was giving way around the edges. The Outworlders had abruptly ceased to be gauche colonials. Now they were self-confident men who knew what they were doing and why they did it.

Rockwood, the spokesman, stepped forward and leaned his hands on the precious wood of McClellan's desk.

"We're deeply moved and highly sympathetic to your plight," he said. "We're filled with pity: the pity we'd have for an idiot who, when given a loaded gun, proceeded to blow his brains out."

"What's that?" McClellan asked, astonished.

"Earth is vastly overcrowded; agreed. We knew that before we undertook your tour. Has it occurred to you that *we haven't* grown overcrowded—and won't?"

"We have small worlds," said Ludwig, the Callistan. "If we allowed ourselves to breed at Earth's rate—"

"Exactly," said Rockwood. The Venusian scowled. "We of the Outworlds have seen the inescapable need for certain self-restrictions, basing our ideas on your mistakes. And we're *damned* if we'll let you upset our way of life because you're too foolish to admit the existence of limitations. You can't or won't understand the nature of your own problem, and we pity you—but we won't cut our own throats for you."

McClellan's tongue felt dry. "You refuse to consider repeal of the Exclusion Acts, then?"

"Obviously."

This was the moment McClellan had feared; he knew it was coming, but yet, somehow, he had irrationally expected the colonists to give in when they saw Earth's plight. Well, he would give it a last try.

"You see no moral obligation to accept some of our excess population?"

"On the contrary—we see a moral obligation to *refuse*," Rockwood said vehemently. "We're right—and helping you to alleviate your overcrowding at our expense would be an unsane act."

McClellan knotted his fingers tightly together and allowed his eyes to slip closed for a moment. Sighing, he said, "In its instructions to me, the Assembly made a few remarks which might be of interest. I was told to exert any means within my power to induce repeal." He paused. "Earth, I'm afraid, has more spacegoing armed vessels than your three worlds combined."

There was an explosive hush in the room. Finally Rockwood said, "You'd use force, then? War?"

"The implication's there," McClellan admitted. "But it's not war, friend. It's survival. You have country estates, rolling green fields. We don't have a free inch of space on Earth."

"And so you'll fight us to make us let you in," Rockwood said acidly. His voice was cold. "You're bigger fools than I thought you were, then. Nine billion of you crammed onto one world, and a mere two billion of us, scattered over three. Why, a war would ruin you. We'd bomb you in a shotgun spray and knock off a hundred thousand no matter where we struck—while you'd have to pry us out of nooks and crannies."

"We'd lose perhaps a hundred million people," added Castellani. "You'd lose billions. I think we could risk it. You'd be crippled long before we were. Of course, that might help solve your population problem—until the next war."

McClellan stared at them coldly. They had him whipsawed neatly. The threat of war didn't frighten them; in this case, there was weakness in numbers. He shuddered faintly at the image of Outworlder bombs landing at random on Earth, killing millions.

After a long moment of silence Rockwood said, "Think over what we've told you, Mr. Secretary. The implication's clear: you're committing suicide. All of you." He smiled grimly. "We of the colony worlds have learned that some laws can't be broken; you don't admit that yet. You think you can breed unlimitedly.

"Well, you can't. You'll find that out soon enough. A limitation exists: and if you don't enforce it yourself, *it will be enforced from outside you.* There's no escaping it."

McClellan stared blankly at the Martian for a second or two, his mind a little dazed. Finally he said: "I don't imagine there's any further negotiating we can do, gentlemen. I'll arrange for your immediate return to your home planets, and thanks very much for . . . for—"

His voice trailed off. He was unable to utter the hollow diplomatic formalities required of him. Scowling, he kicked his foot hard into the thick carpeting, and jabbed down on the communicator button.

When they were gone, he reached for the intercom.

"I want Dr. Kingston, in Research."

A moment later the physicist's crackling voice could be heard. "Lester? We've been expecting you down here. You said you'd come down at 1630, and it's nearly—"

"I know," McClellan said. "Bernie, can you come up to my place instead?"

"Well, if it's necessary . . . but I want you to see a model that we've—"

"I'd just as soon not," said McClellan. "Will you come up?" He broke the contact, making the polite request a direct command.

While waiting for Kingston to arrive, McClellan stared moodily at the tips of his fingers, trying to sort out all the Outworlders had said, trying to rebuild his shattered framework of belief.

They refused to repeal the Exclusion Acts. And they dared Earth to go to war.

Suppose, he thought, Earth *did* go to war—and suppose, then, that despite heavy losses, Earth won. In a century or so, Mars, Venus, and Callisto would be as swollen with people as Earth herself. What then?

Kingston, down in Research, thought he had the answer: the stars. But Kingston was wrong. McClellan saw the answer with naked clarity for the first time now. *We've deluded ourselves too long,* he thought.

War was a short-range solution; a few generations of breeding at this pace and war's gains would be wiped out. The stars? It was the same. They would never find enough planets to contain mankind.

The solution, McClellan admitted bitterly, did not lie in the stars; it lay right here on Earth. Earth had ducked around the problem with subterfuges. The Outworlders had solved it. Farm the sea?

The door opened. "Hello, Bernie," McClellan said wearily. "Sit down. Tell me how this drive of yours is coming."

The wiry physicist smiled happily. "I think we've got it licked, Lester! The field equations show—"

"No equations, Bernie. How long do you think it'll take before you've got a working f-t-l drive?"

"Maybe a week, maybe a month. No more than a year, certainly."

McClellan fought coldness within. He leaned forward heavily. "Bernie—will you do me a favor?"

"Possibly."

"When you have your ultradrive, *hide it.* Don't destroy it, because we'll need it some day, but hide it. Put the schematics away until I give the word, and don't publish your findings. Because once people know there's an f-t-l drive in existence, we're all doomed."

"Have you gone crazy, Lester?"

"No," McClellan said. "I've sudden gone stark raving sane. The ultradrive is a dodge, a subterfuge. It's a substitute for the real answer to our problem. Today there were men from the three Outworlds here. They're controlling population increase up there, Bernie. *They* know what has to be done. We've been looking the other way. And we won't start looking the right way until we're forced to. I know."

Kingston was frowning. "So—?"

"So we suppress the ultradrive. So we stop trying to bludgeon the colonies into taking emigrants. So we sit here, and wait." McClellan smiled faintly. "Some thing will have to give. Earth's a plague spot: the plague is uncontrolled birth. Our cousins on the Outworlds don't want our cancer, so they're closing the lid; if you'll sit on your spacedrive there'll be no way out at all. And either Earth cracks wide open—or it grows up. There's no middle course."

Kingston rose, his face livid. "You're suggesting that I destroy my life's work deliberately, that I keep from mankind the spacedrive that'll give them the stars—"

"Temporarily, yes," McClellan said. "Until this mushroom of breeding is controlled. Then we'll need your spacedrive. Now it can only hurt us."

"No. I absolutely refuse. You can't meddle with science this way, McClellan."

"Very well," the secretary general said tiredly. "I hereby relieve you of your post and discharge you from the Research Bureau, effective today."

Kingston recoiled as if slapped. "On what grounds?"

"Insubordination. Your successor will be a man more capable of taking orders. Perhaps he'll be a little less competent, too, but that's all right. The stars can wait a while for us."

Kingston glared bitterly and without comprehension at McClellan for a moment, then turned wordlessly. The secretary general flinched as the door slammed.

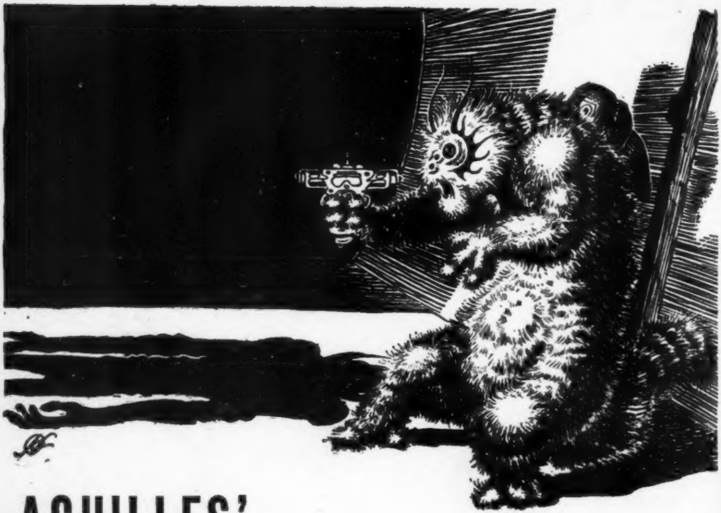
After a while he rose and walked to the window. Firing Kingston had been a tough, ruthless step—but McClellan and the UN had been gentle much too long. Ruthlessness would have to be the order of the day now and forever.

A big job faced him, he knew now. The time had come to stop talking and begin *acting,* and he was in the driver's seat. An order would have to be imposed—and enforced. Ruthlessly.

No. Not ruthlessly. *Sanely* was the word he wanted. And the program would work, for mankind was basically sane. McClellan had spent a lifetime unwittingly preparing for this moment. Now all his diplomatic guile, his shrewdness, his real reservoir of strength, would be needed in the struggle to give humanity that which it desperately needed and which it obstinately refused to accept.

McClellan glanced outward. Night had fallen, now; two or three bright stars broke the haze of city lights. McClellan drew a deep breath and stared out at the darkness, seeing, not the billion billion bright lights of the teeming city, but the three faint twinkling hopeful dots that were the stars.

THE END



ACHILLES' HEEL

BY CHRISTOPHER ANVIL

Almost any wonderful advantage you can name becomes, under the wrong circumstances, a lethal weakness. Man's tendency to see in others his own problems, for instance, helps . . . sometimes!

SUPREME Interstellar Marshal John von Eckberg Lindt knocked the ash off the end of his cigar onto the floor of Supreme Headquarters, and shifted his powerful body into a more comfortable position in the padded swivel chair.

Across the room, from floor to ceiling and wall to wall, lights winked and relays clicked as Combat Forces Master Integration Computer changed the dispositions of the Fleet to counter the latest Wij-Wij probe. At the foot of the enormous bulk of Combat Forces Master Integration Computer was a cot. On the cot lay

Illustrated by Freas

a man, with one hand trailing on the floor. This man was James Edison Martell, recognized as the greatest pragmatic scientist since his namesake, Thomas. In the hand of James Edison Martell was a somewhat battered silver flask, from the cap of which a clear brownish liquid leaked out to stain the floor.

Supreme Interstellar Marshal von Eckberg Lindt was considering the philosophical implications of Martell, the computer behind him, and the flask, when the Immediate Action buzzer sounded on his desk.

Lindt put his feet on the floor, and glanced alertly at the desk top. A hole opened up, and a sheaf of papers jumped out. Lindt picked up the first sheet, noted that it was an Allocation of Supply order, signed it and set it aside. The rest of the papers were lists of promotions, demotions, classifications, transfers, appointments, adjudications of jurisdictional disputes, tactical and strategic decisions and evaluations. Lindt glanced rapidly through them and signed all but the demotions and strategic evaluations. He stacked them neatly and set them on a faintly outlined square on the desk. The desk top opened and the orders vanished like laundry down a chute. Lindt gave his attention to the strategic evaluations:

OSD 6: All Sectors Overall situation at present critical. Density of stellar systems under enemy (Wij-Wij) control great, enabling high order of productive capacity. Adaptive Wij-Wij physiology apparently enables use of most planets in their systems. Though impossible to verify this, as no Wij-Wij prisoners have yet been taken alive. Nevertheless examination of enemy dead reveals complex nervous structures whose function appears to be internal adjustment to the external environment. For whatever reason, Wij-Wij military productive capacity has increased at a violent pace since our initial armed clash, and is expected to surpass human productive capacity in the near future.

Estimate of enemy psychology indicates brittle superiority feelings underlain by dread of unknown origin, coupled with severe strain due apparently to adaptive stresses on unlike planets; together with these seem to be feelings of inferiority, due to superior tactical and strategical handling of human fleet and resources. There may also be a lack of psychological adjustment to "emptiness" of spaces occupied by humans. In any case, there is clearly an indisposition to send any but very heavy forces into these regions of space.

The expected enemy action is a violent single thrust with all forces united in one massive fleet.

The planned human counteraction is: Resistance to the last possible moment at selected points and belts in line of attack. Leapfrog withdrawal to new strong points and belts in line of enemy penetration. Pinching counterattacks against sides and rear of enemy fleet. Simultaneous counterattacks directed toward vital enemy communications centers in the region of the star, alpha-Primorus.

The anticipated result of the action is uncertain.

In summary, the Wij-Wij enemy appears to be acting under some powerful compulsion, possibly the dread of a supposed innate human superiority. Whatever the cause, study of captured armaments and observed enemy military activity clearly indicates a rapid increase in military strength and its underlying productive capacity. Coupled with the fanatical Wij-Wij hostility, this strength is expected to be used in one single-minded deadly thrust whose outcome cannot be predicted.

Lindt frowned thoughtfully, reread this paper, signed it, and dropped it down the waiting hole in the desk top. He picked up the list of demotions, read down them, snorted suddenly and crossed one off. On the back of the sheet, Lindt wrote:

"Re: BVIII Decision 0-624. The girls on the planet mentioned—I say this from personal experience—heave mats over electrified guard fences to get into fortified camps; they dig tunnels under roboticized guard lanes; when the wind is right they drop into camp on specially built one-woman kites. The crime mentioned is, on this planet, no more likely than murder committed by pushing a suicide long after he jumped. The officer's punishment is reduced to a fine of one dollar. He is not to be demoted; he is to be reassigned. J. V. Lindt, S. I. M., Comgen B."

Lindt read through the rest of the list, made a few notes, dropped the paper down the hole, which snapped shut, and put his feet back up on the desk. He tossed his cigar stub on the floor, and watched as a long low thing like a miniature alligator on wheels slid into the room, scooped up the cigar and ash, gave Martell's leaking bottle a quick wipe, and vanished through a low hole in the opposite wall.

Lindt settled in the chair, moved his feet around to a more comfortable position, then stripped the wrapper off another cigar, lit it, and blew out a cloud of smoke. He looked across the room at the clicking, clacking, flashing monster which was theoretically a member of his staff, and spat a fleck of cigar leaf onto the floor.

What, he asked himself, gave the Wij-Wij their fanatical drive?

Lindt ached with the urge to issue a new general directive and rap the Wij-Wij where past experience told them they were safe. But he restrained himself. He had tried that once before. He had got a resounding victory. At the same time, supply schedules were unstrung from Earth to the Border, the Wij-Wij redoubled their efforts, and he ended up right where he'd started. Lindt glowered at Combat Forces Master Integration Computer, sucked on his cigar, and began going over the problem again.

The computer clicked, murmured, chortled, and twinkled.

On the cot at its foot, James Edison Martell rolled over and put the bottle in his mouth.

The alligator-shaped robot slid through the wall and wiped up the brownish stain.

Inside the wall, a bimetallic spring adjusted slightly to keep the temperature at a cozy seventy degrees.

Supreme Interstellar Marshal John von Eckberg Lindt fell asleep and dropped his cigar.

The alligator-shaped robot snapped it up.

Martell groaned.

Combat Forces Master Integration Computer droned competently, clicked, hummed, and flashed securely.

Its drone climbed to a roar, subsided to a tremor, rose to thunder—its lights bright like the eyes of a maniac, then dim with the exhausted flicker of a weary invalid. The walls of the room flared in the glare of the overhead lamps, grew dim in their dying glow, then blazed again to dazzling brilliance.

Lindt landed on his feet. For an instant he knew neither who he was nor what the scene around him meant. Then he heard it.

Wij-wij-wij-wij-wij-wij-wij

Lindt sprang for the locker, yanked out a chute suit and threw it to Martell. Lindt climbed into one himself, pulled the fastening strings tight, and glanced at the computer. Useless. With the current varying wildly from instant to instant, the computer was no more fitted to live than a man in a vacuum without a suit.

Lindt glanced at Martell. "Hurry up and follow me."

"Where to?"

"Chute. Turn left in the hallway."

"Coming."

Lindt trotted out the door and into the hall.

Wij-wij-wij-wij-wij-wij-wij

He dove through an oblong black hole, felt the leathery surface of his suit catch and slide, then catch. He shoved back hard with his hands. The chute dipped and he dropped fast on the oiled slide.

Wij-wij-wij-wij-wij-wij-wij

The wind blew back hard on his face. Thick layers of rock and metallic ore fled upwards past him. The next time the sensation came it was milder.

Wij-wij-wij

The slide dropped him fast, curved gently, hissing against the hot surface of his suit. Then he was sinking into thick, deep, foamy layers, air bubbles trapped in thin plastic. The bubbles burst as he sank, down and down, slower and slower, to come up angrily, his reflexes eager to trigger the counter-punch, his muscles aching for the word—

Wij-wij-wij

He went out into a lighted hallway, the yellow glow of oil lamps varying slightly, lighter and darker, as the Wij-Wij attack hit the gravity compensator and changed the lamp draft even at this depth.

Wij-wij-wij-WIJ-WIJ-wij-

Lindt stumbled. Everything seemed to go dark. He almost fell, then sprinted down the hallway. Ahead the corridor narrowed, the ceiling coming low. A sign read:

COMMAND AREA—SHIELDED

Lindt strode around a corner, into the suddenly bright glare of steady electric lights. He shrugged out of his suit. Martell stumbled into the room behind him.

"Boy," said Martell, pulling off his suit, "they've got that thing directional now. They nearly put me out on the way down that hall."

Lindt grunted. He was looking the room over, noting that it was, as it should be, a duplicate of the room above. Only it was too close a duplicate. Down here, the duplicate Combat Forces Master Integration Computer was supposed to run from its own shielded supply, receiving reports micro-angled through sub-space to the huge manifold in the next room. But the gigantic face of the computer was silent and unlit.

"What," said Lindt, "is wrong with that computer?"

Martell scowled, stepped to the face of the computer and glanced at a dial. He threw a switch over and back.

"Current supply is O.K.," he said. He stared at the face of the big machine, glanced at Lindt. "How bad is the situation?"

"Very bad," said Lindt. "Orders issue from this place direct to seven sectors of the B shell. We're expecting an all-out attack any time. The attack will probably be simple and massive. Our reply is so complex that it has to be perfectly co-ordinated or we'll get ground up piecemeal."

Martell grunted, and went behind the computer. There were sounds of metal sliding on metal.

Lindt became aware of the continuing silence in the room. Unless this local surprise attack was worse than he'd thought, his staff should be here now. He stepped over to the communications screen and set it to receive only. He dialed Weapons Evaluation. The screen flickered, and showed three men slumped at desks. Beside one of the desks was a creature something like a giant furry inchworm. Lindt stiffened, switched the scene to Supply. A pile of men lay one on top of the other near the doorway. He switched to Monitor, selected Corridor I, and saw a file of giant inchworms with packs on the middles of their backs, carrying T-shaped weapons. Each of them seemed to be watching and aiming in a different direction. Their stance and hasty bobbing walk gave them a look of terrific urgency.

Lindt switched from corridor to corridor, finding some empty, but most containing at least a few of the inchwormlike creatures on guard.

From behind the computer, Martell's voice brought a muffled string of oaths. Lindt looked up. Martell came around the corner carrying something like a drawer from a file cabinet. He held it up for Lindt to see.

"Look at the label," said Martell. "Read it."

"P-06-XLVPT-201J-12LVBXc."

"It's supposed to be, 'P-06-XLVPT - 201J - 12LVBXb,' " said Martell.

Lindt glanced back at the screen, stepped aside and pulled a lever set into the wall nearby. A very light detonation made the room tremble. Lindt turned to Martell. "What of that?" he said. "Because it's VBXc, it won't work?"

"No," said Martell. "Because it's VBXc it won't work *right*. The b is the standard model. The c is supposed to be for a larger experimental computer. Somewhere some man or supply machine slipped up. Since this component is replaced every three months, every military computer in the system probably has a c in it. The effect isn't to stop the computer. The effect is inaccuracy."

"In that case," said Lindt, "why won't this one work?"

"Internal cutout," said Martell. "This computer and the one upstairs have the same design, receive the same information. All the computers are connected by direct cable or through subspace manifolds. They all come to the same conclusions. This sudden raid is obviously something unexpected, at variance with the calculated possibilities. When anything at variance with the calculated possibilities arises, the computer has to run an internal check. A special circuit is cut in, a complex many-stage problem with known data and known answers is fed to the computer circuits and simultaneously to the memory banks. The results are compared, and if there's any variation whatever, the computer knows it is inaccurate. Then it checks itself circuit-by-circuit till it finds the trouble. The defective assembly pops out and the computer won't operate till the check finally gives the right answers for known problems.

"This happens to all the computers?"

"All. They're all connected together. The communications lag through subspace is insignificant."

"Who thought of this?" asked Lindt abruptly. "A human, or another computer?"

"I thought of it," said Martell. "And I pushed it through despite engineers who thought they had the Perfect Machine."

"Then," said Lindt, "every Combat Forces Master Integration Computer in the system is out of action?"

Martell nodded. "And will be, till that circuit is replaced."

The communications screen buzzed. Lindt snapped it on. A tense group of oversize furry inchworms was there, clearly trying to see. Lindt let them squint in vain. He glanced at their weapons, which were T-shaped, the same fore and aft, like two revolvers with a common grip. One muzzle aimed toward Lindt's screen, and the other toward the Wij-Wij using it. The creatures had four fingers, two around the grip and one on each trigger. Lindt stared at this arrangement, then looked up.

"Herro," came a flat even mechanical voice, sounding l's and r's the same. "Herro, cerrs remaining of superbeing rogicar. Your prexus dying is. You we detected. Resistance hoperess is. Actions you predictabre. Come harrway six surface to. We you harm cannot. You we onry information want. Since resist hoperess is, no choice you. Come harrway six surface to. *Now*."

Lindt frowned at Martell. "That computer has apparently done everything so according to the odds they think we're perfectly logical."

Martell was scowling. "Where did they learn to translate with a German accent? And what is that about our 'dying plexus.' "

Lindt squinted. "It sounded more Japanese to me." He glanced at the screen, and switched to the shattered room he and Martell had left during the attack. "As for our 'dying plexus,' I detonated the emergency mine inside the computer upstairs. The Wij-Wij sound as if they think of us as one big creature. You and I and everyone else is a 'cell,' each computer is a 'plexus,' and I suppose our chains of command are 'nerves.'" He frowned again and switched back to the intent group of giant inchworms with their double-ended guns.

"Well," said Martell abruptly, "that tells us something about the Wij-Wij. But will we live to use it? Come on. Let's get out of here."

"There's no way," said Lindt. "But can you use this computer to get some information out?"

"Martell was walking back to the computer. "We can do better than that," he said. "Stick right with me." He opened a tall panel in the side of the computer and stepped in. "Pull that shut behind you."

Lindt frowned, followed, and found himself in a tall narrow corridor. He pulled the panel shut, and followed Martell.

"Access corridor," said Martell. "We have to be able to get at the inside of this thing somehow. And at these cables overhead." Martell wound his way expertly among the narrow branching corridors, and Lindt followed closely. The corridor they followed widened, and the overhead cables and wires increased in number. They stepped out into a room where big branching ducts led to a single giant conduit that passed into the wall. "Recognize it?" asked Martell.

"It's out of my line," said Lindt, "but of course it must be the subspace manifold."

"Right." Martell began carefully working at a section of the largest conduit, which was about five feet in diameter. "You know what's in here?" he asked.

Lindt said, "The micro-angle mechanism, whatever that may be."

"Exactly," said Martell. "And now I'll tell you. Wait—" The section of conduit, a rectangular piece about two feet by three, suddenly came loose, and Martell set it down with a grunt and a clang. "Inspection plate," he said. "We usually do the inspecting with a mirror or a stick, or an X ray on the overhead trolley. Some brave souls go in. When I was a brash youth, a friend of mine in Section A used to toss wadded-up messages along the floor of the conduit, and twenty feet away in Sector B III, I would fish them out."

Lindt blinked. "Twenty feet—?"

Martell nodded. "Twenty feet. The micro-angle conduit is a tube of normal space twisted around on itself and bent through subspace. 'Micro-angle' refers to the sharp curve of space in the cross-section of the tube."

"Why don't we use these things

for supplies, transport of personnel—"

"Too expensive for supplies, and when you get in there, you'll see why we don't use it for personnel," said Martell, stepping back. "You go first. Cling to that big thick cable in the center. Just keep your mind on moving steadily ahead. When you come to a junction, go any way at all. I'll follow right behind you."

Lindt frowned, took hold of the edge of the rectangular inspection opening, put his leg over and got in. The conduit stretched out before him, dimly lighted. Lindt felt uncomfortable but not uneasy. He moved forward, slowly, bent sideways, with an arm on the thick cable.

The awkward part was that of moving ahead through a five-foot pipe with roughly a two-foot cable taking up the center. A little ahead, he noticed that the wall of the tunnel seemed made of a different material. He reached that point.

Gravity went.

Lindt seemed to be falling. Not down. Not up. But in on himself.

His head was shrinking. His limbs spread in all directions like the arms of a starfish. He was collapsing like a balloon with a stone tossed on the center. His legs and hands were enormous.

"Keep moving," said Martell, his voice coming at Lindt from all directions at once, like the rays of the sun going backwards, and not all striking home at the same time.

Lindt pulled on the cable. Tugged and pulled in an automatic motion he remembered from sometime, but that had nothing to do with him now, except that he knew he had to try to do something.

His legs and arms were enormous, long and stretching longer. His body somehow was spread out around his head like a flapjack around a pat of butter. And stretching farther, thin and—

Snap

His legs were touching each other, all their feet together. His head in its finite but unbounded size rimmed the edge of eternity.

He kept his hands moving.

Snap

His heads were flying apart, his arms around each head like wheel spokes, his long thin bodies pinwheeling out and away from his distant feet. His hands groping along the cable wall around him.

Snap

Like a thousand-mile-long cable himself, equipped with a pin-size head and two stubby arms at one end, and tiny feet far out of sight at the other end, he crept like a stretched-out dachshund toward a faraway forgotten goal, past a strange wavy line of demarcation in the wall of the endless tunnel he was in, and—

Snap

He was himself.

Hanging to a two-foot thick cable in a five-foot conduit, in a dim light with his memories coming back thick and strong.

The noise Lindt made brought the

technician who let them out of the conduit.

"That," said Martell, "is why we don't use the conduit for personnel transport."

Martell led the way back, with Lindt grimly following. Behind came fifty genuine volunteers, heavily armed, their teeth gritted, and hooked together by a rope. They were coming out of the manifold shaking and cursing just as six big inchworms came in through the inspection corridor.

The nearest volunteer snapped his gun to his shoulder, said "Ahhh," and fired.

The shot hit home.

Lindt, his own gun snapping to his shoulder, saw both the Wij-Wij's fingers contract. Simultaneously, the others jerked in unison, then snapped up their T-shaped weapons.

Wij-wij-wij-wij-wij-wij-wij

Lindt was sure he got two himself. But that was not what occupied his mind. He bolted down the corridor, twisted and turned. The corridor narrowed.

Three big inchworms turned to face him. Their T-shaped guns swung up.

Lindt took a flying leap for the nearest one, drove his fist hard into the fur and the rubbery flesh beneath. He knocked the gun to the floor. His foot trod and ground on the feet of the Wij-Wij. His hand, seeking, found what he was looking for—a joint. He bent one of the creature's forearms sharply back, and twisted.

A soundless shriek split the air around him.

He grinned like a bulldog with its teeth set in solid flesh, and prepared to hang on till the clock of the universe runs down and stops.

He looked up, his mind still closely attending to the job of grating that forearm, twisting, bending, and almost but not quite snapping.

"What in space—" came a voice.

The two other big inchworms were leaning weakly against the wall, their weapons on the floor and plainly forgotten.

Martell came around a corner, his eyes wide.

"They're all out on their feet," he said, then looked sharply at Lindt. "Oh," he said, "then they're—"

"Telepathic," said Lindt, "*fully* telepathic. Get out there and tie them up."

The place was secure again, and Lindt had his feet on a new desk.

Martell was sitting on the edge of his cot, grinning. "You're sure they won't commit suicide, or get murdered?"

"How?" said Lindt. "And does a man's finger commit suicide, when someone bends it back? True, at the time the man might want to chop it off to get free, but that's hard to do in that situation. Nobody's likely to get through to these prisoners now unless they try a full fleet action, and as soon as they try that, we'll turn the thumbscrews. Live and let live."

Martell burst out laughing. "And

telepathy's supposed to be an *advantage.*"

"It was," said Lindt, "so long as they fought actions where they got killed, not captured. If one got painfully hurt, he pulled the other trigger so the rest could fight on. No wonder they avoided little skirmishes. A man can take a lot when he's part of a tremendous attack. The sharp pains and the impact don't bother him then. It's the steady nagging pain that wears him down. The pain that just gets worse when he tries to get loose. That's what their telepathy does to them, and we've got their collective finger bent back. But it *was* a help to them before. No wonder they expanded so fast, with that co-ordination. And no wonder they were scared of us. They think of themselves as all one big creature. They must think of us that way, too. But pain and defeat in one sector doesn't stop us or make the whole human race wince and fall back. They must have thought of us as we think of a fanatic who can't be stopped by ordinary fears or pains, who'll lose a limb or take a wound and just keep on coming. No wonder they were frantic and thought they had to do away with us."

Martell nodded and lay back. "I hope we've had an end of that." He glanced at Combat Forces Master Integration Computer, clicking and flashing with a bland assumption of superiority. "Now I have a new viewpoint on that thing, too," he said. "It's mankind's habit-mind, that's all. We can turn it off and do without it, if necessary. We can think of better things. I've got a friend down the conduit in Sector AXIV, who thinks we ought to do away with these integration computers entirely."

"No thanks," said Lindt. "Habit has its limits but it's useful. You need habit and originality both." He took out a cigar and began to peel off the wrapper. "Somehow, you, me, and the computer have to get what's happened across to the Wij-Wij. Making them jump with pain every time they turn a fleet our way is good, but not good enough."

Martell nodded.

Lindt wadded the cigar paper.

The little metal alligator on wheels trundled in, receptors on the paper, and waited.

Lindt tossed it aside, lit the cigar and sent out a cloud of smoke.

SCIENCE FICTION
SCIENCE FICTION

THE REFERENCE LIBRARY

BY P. SCHUYLER MILLER

A LOOK IN THE MIRROR—

I may tend to back away when hotly attacked for making a positive statement—"Today is Tuesday"—but one thesis that I think I can defend is that just about the most energetic bunch in fandom is the New Jersey outfit known collectively as Fandom House, and severally as James Taurasi, Sr., Ray Van Houten, and currently Frank Prieto, Jr. They have made the semimonthly *Fantasy Times* the acknowledged newspaper of fandom, garnered Hugos almost without leaving Paterson, and they have now added to their laurels with their first "Science Fiction Yearbook."

This 42-page mimeographed annual will cost you fifty cents from the publishers at P.O. Box 2331, Paterson 23, New Jersey, U.S.A. It is a survey of science fiction in 1956, statistical and editorial. The senior publishers—and editors—open with a running account of the year's alleged boom, add some notes on foreign magazines, and go over the New York Convention fairly but honestly. Conclusion: "The Convention, though good, was a dud. . . . The committee had gone in for the biggest and best, and had delivered it, only to find that the average attendee just wasn't enjoying himself."

There is a very sketchy account of some of the highlights of organized fan activity in '56, then Frank Prieto sums up the prozine publication history of the year—and J. Harry Vincent later sums up the newsstand situation as of press time. Dr. Thomas Gardner contributes his annual appraisal of the magazines. Forry Ackerman looks at the year's alleged SF films. With restraint, the general conclusion is "Ugh!" Steve Takacs of New York's lone SF bookstore lists the hard-back and pb books of the year, give or take a few (some people buy the Dikty anthology just for Earl Kemp's version—at $4.50!).

But the meat of the "Yearbook," and the reason you meet it here instead of a few pages farther on, is Sam Moskowitz's report on the survey he ran during the Convention, to find out who reads science fiction, what they read, and what they're like. He has confirmed some impressions and turned up some surprises.

Sam, it appears, comes to the statistical analysis of science fiction from the statistics of frozen fruit pies. Joking aside, he makes his living on surveys and squanders it on SF: he is eminently qualified to give us this kind of report. Though he doesn't tell us the size of his sample, he does say it was about a third of the registration at the Convention, which puts it way ahead of my own poll so far as probable validity goes. If there is a major bias in it, it will be the selection of readers who could get to the Biltmore over the Labor Day weekend—but this skimming of some kind of cream off the bulk of the United States and Canada should be countered by the fact that New York fans just had to hop on the subway.

Fifty-eight per cent of the people answering said they had no interest in fandom: they're counted as "general readers." The rest (42%) are the fans . . . and there's surprisingly little difference between the two groups. In age, about a third are between twenty-one and twenty-nine (35% of the general readers; 32.5% of the fans)—but the next largest sector of fandom is in the teens (24.3%), while the general readers have 30% in the thirty to thirty-nine year bracket. About a third of both groups have their primary interest in science and engineering (34.9% of the general readers; 33.7% of the fans). Among the general readers, students rank second; among the fans, it's the arts-and-literature crowd—including, I am sure, the hopeful writers and publishers of fanzines. Business—the office gang—is about as important as the students among general readers, but a poor fourth in fandom.

It would take a sizable chunk of this magazine to comment on all Sam's findings, but here's what came out in the summary.

The fans buy more magazines and more books—but the general readers buy more paperbacks. Ninety-six per cent of them get part of their SF in this form, and 38% buy more than two titles a month. The typical reader in both classes buys several magazines, some regularly, some occasionally.

Top favorites were the same with both groups: Astounding first among regular purchases (69% in a composite score), *Galaxy* second (65%) *Fantasy and Science Fiction* third (57%)—then a 20% gap to the next in line, and a disagreement between the fans and the general readers. In occasional purchases, *If, Galaxy* and *Amazing Stories* were neck and neck in the composite: as Sam points out, the magazines that are read regularly should expect a low "occasional" score. Combining the two gives *Galaxy* a few per cent edge over this magazine. Apparently more readers pick it up, but don't stick to it.

However, any conclusions in this matter involve another big factor with which I long have been concerned: availability. I think there is good evidence that SF magazines—*especially the best magazines*—are not distributed consistently or even intelligently by local wholesalers (and often, here in Pittsburgh at least, may not be distributed at all). The fan will go hunting for the magazines he wants; the casual reader will miss any issue he can't find in his regular haunts.

Extrapolating from his figures, and from the sworn circulation of Astounding—the only magazine in the field that does make such a report—Sam concludes that the SF field is supported by one actively interested group of about one hundred fifty thousand readers, of whom less than 10% of the multiple buyers account for 32% of all SF magazines sold. Pocket books are the big rival—as our own poll showed pretty clearly, a year ago. There's no real juvenile field: the average reader is over twenty-one, and he reads just about anything that comes his way. This does *not* mean that there's no room in SF for action and adventure stories of the kind that a literary critic labels "juvenile." As a matter of fact, readers of *Amazing* with its avowed action policy average *older* than readers of this high-science magazine. (This may just mean that they find more "old fashioned" SF there.) What's more, 75% of the general readers who read *Amazing* regularly also read Astounding regularly.

This is only a morsel of what Sam has probed and teased out of his score-sheets. By and large, his survey confirms the two studies of Astounding's readership that John Campbell has run: science-minded adults rank first, and are omnivorous readers. It also bears out the pretty general contention that this magazine is not only the most popular, but the most representative of the field—though if you like fantasy with your SF, your choice has to be *Fantasy & Science Fiction* (or both together), and *Galaxy* is so close that the figures probably shuttle back and forth from month to month, affected and maybe even controlled by that distribution factor that I mentioned.

Get your own copy of the "Science Fiction Yearbook" for the whole story.

I may have left the impression, last month, that I am a follower of Rudolph Flesch's formula for "readability." I'm not: I *like* Merritt's flowery toying with the language, his pulling in colorful phrases out of the bleachers, and all the rest. I do, however, admit that the more the human figures and their problems take the center of the field, the better the book is. This is probably why "The Metal Monster" falls down: you're watching the metal creatures almost exclusively, and the human adventures are really negligible.

As for Flesch, I scored a one hundred-word section taken at random out of the new Pittsburgh phone book. His "r" rating is based, among other things, on the count of proper names and numbers—which gives the phone book a readability score of ninety-six (with anything over twenty-five considered highly readable). The "e" rating (forcefulness, vividness) includes scores for dashes and italicized or emphasized words (the exchanges, in this case). The score comes out thirty-three—and thirteen is "highly vivid."

Give me Merritt! Give me Lovecraft! Give me the dictionary!

I goof, from time to time—usually quite violently. When I do, Norman Metcalf of Berkeley, California, is usually the first to set me straight. A card this morning, for example, points out nicely that Arthur C. Clarke's "The Deep Range" (short story version) was in "Star Science-Fiction Stories, No. 3," not here.

I've caught one myself, that Norm hasn't yet had time to pin on me—though he will, and many others. Of course, as you knew at once and I should have, Wells Alan Webb described his theory of the Martian canal network right here in these pages, back in March, 1956.

Nope—I didn't awake at 3:42 a.m. with a sudden horrible surge of total recall. I read his article, "On the Rejection of the Martian Canal Hypothesis," in the July, 1957 *Scientific Monthly.* They credit Astounding, which is more than he does himself.

No great harm done, but I'd have approached the book a little differently if I'd remembered where I met his ideas first.

I've worked too far ahead of publication date to give you a running report on the World Convention in London, now (as you read this) several months gone. By an unlikely turn of events, I am able to announce the Sixth Australian Science Fiction Convention, which will be held Easter week end (April 4-6) 1958 in Melbourne. Open house Friday night; program Saturday; picnic Sunday—do they have Indian Summer down under? G.I.'s in the

Pacific, and other far-wandering folk, write to Barry J. Salgram, Box 38 P.O., Mentone, Victoria, Australia for information. Don't be impatient; the notice I got today took a month coming.

* * *

You may remember Bernard Wolfe's novel, "Limbo," as a tough and heavy extrapolation of a sex-centered future in which a masochistic cult of the crippled has arisen. In an interview with *Saturday Review*'s Jerome Beatty (July 27, '57, page 6) Wolfe remarks plaintively that his three novels have been deliberate satires on types of popular fiction—and that the critics and reviewers have swallowed them whole, and either attacked them or praised them for being what they were never intended to be. "Limbo" was a satire on science fiction, "The Late Risers" on the Broadway novel, and his new "In Deep" on chase stories.

Sure enough, in the August 4th New York *Times* Book Review, "In Deep" is soberly analyzed, chided for its "turgid bursts of rhetoric" and lack of drama, and praised for generating "a certain amount of excitement and suspense." On Mr. Wolfe's face, doubtless, is a certain smile of despair.

* * *

ON THE BEACH, by Nevil Shute. William Morrow & Co., New York. 1957. 320 pp. $3.95

This is the story of the last months of Mankind, a few years from now, when the fallout of a "short war" gradually distributes itself over the face of the planet. Its mood is set by the now over-familiar lines of T. S. Eliot on the title page: "Not with a bang but a whimper."

The last war, it appears, begins in 1962 when Albania drops a small A-bomb on Naples. For some reason, this is followed by an anonymous one on Tel Aviv. Assuming *that* bomb is Egyptian, the United States and England make a demonstration flight over Cairo, and the Egyptians —using Russian planes and presumably bombs—take up the dare by plastering Washington and London. NATO, assuming that the Russian bombers had been sent from the Kremlin, follows through by retaliatory raids on the Soviet cities . . . and China, suspecting a scheduled move on Shanghai, jumps on the Russians' back. Since everyone uses "dirty" cobalt bombs, designed to kill by fallout as much as explosion, the entire northern hemisphere is rapidly depopulated. As the story opens, the killing dust is slowly being carried into the southern hemisphere, where the remnants of the United States Navy have placed themselves under Australian command for the few months before the holocaust is complete.

The author simply follows a small group of people, Australian and American, through these last months. There is no melodrama, and in fact no drama. The major air of unreality about the book is the quiet, genteel manner in which everyone, the world over, lies quietly down to die—without panic, without rioting, without private or public hysteria, down to the last dog and cat.

Lieutenant Commander Peter Holmes is assigned as Australian liaison officer on the United States atomic submarine *Scorpion.* He and his wife make friends with the American skipper, Commander Dwight Towers, whose wife and children perished in Connecticut. Towers strikes up a stand-offish companionship with the daughter of a neighboring farmer, Moira Davidson, who subsists primarily on brandy. The fifth character of any importance is a young physicist, John Osborne, who winds up in a blaze of glory in the world's last sports-car race. They wrangle, they stare gloomily at the future, the *Scorpion* checks the Pacific coast of the United States for signs of life—and doesn't find them—and they come home to die neatly and with proper dignity, one by one.

It sounds dull, but Nevil Shute is enough of a storyteller to keep it moving somehow. His Americans certainly don't sound American—but I suppose our English don't speak English, either. Personally, I thought the Aussies had a little more raw meat in their diets . . .

TWO SOUGHT ADVENTURE, by Fritz Leiber. Gnome Press, New York. 1957. 186 pp. $3.00

Five of these seven stories of fantastic adventure in the land of Nehwon appeared in *Unknown Worlds* between 1939 and 1943; the other two were published much later, in *Other Worlds* in 1953 and *Suspense* in 1951. I don't know whether or not they were written as a kind of "answer" to Robert E. Howard's Conan yarns, or whether Fritz Leiber simply decided he could have fun with the formula, too. He did have fun, and so did many of his readers, who found the tales more slyly believable than the bloody derring-do of the Cimmerian sword-slinger.

In these seven tales, a team of tongue-in-cheek adventurers, the giant Fafhrd and the slight and sly Gray Mouser, take on assorted manifestations of magic in various parts of a world as dubiously like our own as Conan's. They are timeless and placeless, but people remember them. I'm glad Marty Greenberg has put them inside covers.

JULES VERNE: MASTER OF SCIENCE FICTION, by I. O. Evans. Rinehart & Co., New York. 1957. 236 pp. $3.00

I picked this book up thinking it was a new biography of Verne. Instead, it's what should have been called a "Verne Sampler"—fifteen excerpts from his books, plus a very good thirty-six-page introduction discussing the man and his place in science fiction. The English edition was out, I believe, last year; only the title page is changed for the American edition now.

Verne's writing may bore you, but you'll find these samples—some, I feel sure, paraphrased rather than reprinted in full—give a better idea of his versatility than you've had unless you're a Verne student. The editorial comments on the various sections also add a good deal.

For the record, the books represented are: "Journey Into the Interior of the Earth" (you'll find the English rather than the American titles used); "From the Earth to the Moon" and "Around the Moon"; "Twenty Thousand Leagues Under the Sea" and two sections from its sequel—the first Verne book I ever read—"The Mysterious Island"; the non-SF "Child of the Cavern"; the most fantastic of all his books, "Hector Servadac,"—he was carried away by a comet; the little known story of two rival utopias, "The Begum's Fortune"; "The Steam House"—a robot elephant; "The Clipper of the Clouds," first of the world-conqueror novels about Robur; another utopian satire, "The Floating Island"; Verne's near-atomic bomb in "For the Flag"; his ending for Poe's "A. Gordon Pym"; and a bit from his first book, "Five Weeks in a Balloon."

FIRST ON MARS, by Rex Gordon. Ace Books, New York. No. D-233. 1957. 192 pp. 35¢

This appears to be the book whose hardcover edition was published in England, some time in 1955-56, as "No Man Friday." If so, it's a pity that I didn't read the Ace edition sooner, and doubly a pity that no American publisher has seen fit to put it between boards over here. In any other season, it ought to be up there with the contenders for the International Fantasy Award, but the two years' accumulation—from which the Panel will have made its selection by the time you see this—contains too much hot competition.

To my taste, the book is just about an ideal example of the underplayed "documentary," and the longer I think about it, the better it gets. The narrator is Fuel Consumption Engineer on a surreptitiously launched British Mars-rocket. Shortly after leaving Earth, while he is outside making repairs, carelessness with the air lock destroys the rest of the crew, leaving him to make a fantastically lucky crash landing on Mars, alone. And for fifteen years, Gordon Holder is able to live as a Crusoe on a desert world where there is not enough oxygen or water to sustain life, where a fire won't burn, where the temperature falls every night farther than in a Siberian winter. . . .

The key to the book is that this is a Crusoe story—not a "Swiss Family Robinson," with its bountiful and miraculous manna showered down whenever the need is indicated. Holder has what is left of his rocket and its contents; he has Mars—the Mars of the astronomers, not of a Burroughs romance; and he has his own trained brain. Actually, he has a little more, though without the first three he would never have lived to take advantage of the native Martian life.

These aliens are also utterly convincing. They are not transplants of earthly flora and fauna, but they fill ecological niches comparable to those of our own deserts, and so they are similar. There are flowers. There are social, honey-making insects to pollenate them. There are instinct-driven migratory manlike vegetarians to eat their fruit and spread their seeds. And there are the others. . . .

Out of this grows the problem of Man in his relation to the universe of planets. Why do we strive? Can we forego the violence that we have always taken with us? What will become of us if we're not stopped . . . and if we are?

It's a book that belongs beside the best of Heinlein, Clarke, Wyndham for quiet reality, and with Hal Clement for realization of an alien setting and alien life.

ROCKETS, MISSILES, AND SPACE TRAVEL, by Willy Ley. Viking Press, New York. 1957. 528 + xv pp. $6.75

Need I remind this audience that this book is *the* one-volume encyclopedia of rocketry, past, present and future? Its first edition appeared in 1944, four months before the first V-2's began to fall on London. I have a feeling that it will outlive its author and be perpetuated, like Gray's "Botany" and Dana's "Mineralogy," into an era when only the winner of a sixty-four thousand-credit TV quiz can identify the man behind the name.

This is the eighth revision substantial enough to call for a new copyright; the last appeared five years ago. You now get 543 pages instead of 448; a 33-page bibliography instead of 19 pages; 31 plates instead of 22; 85 text figures in place of 64 (though you've lost the tipped-in color chart of the Earth's atomsphere, published originally by Douglas Aircraft and somewhat dated).

The historical sections of the book —the most complete you'll find anywhere—are the same in all but minor details up to about the middle of page 188, in the chapter, "The Return of the War Rocket." Here the new material begins—and the best way to tell you what it is, in a reasonable space, is to crib from the author's own introduction. The story of the German rocket base at Peenemunde has been completely rewritten with the help of Wernher von Braun and Walter Dornberger, the men responsible for its successes. The White Sands story has also had to be completely revised to bring in formerly classified material. Step rockets are now something that we are building for the "Vanguard" satellite program, not merely an extention of theory—and this, too, has been fitted in, as have the newer ideas and computations on space flight. To round out the picture, the always voluminous set of appendices has been extended by data on American and foreign rockets, and on the United States and British guided missile arsenals as of last year.

There is no more complete book on rockets, and as long as the publishers keep on playing the game as they have, it's unlikely that there will be one.

FLYING SAUCERS: FACT OR FICTION? by Max B. Miller. Trend Books, Los Angeles, Cal. No. 145. 1957. 128 pp. 75¢

THE EXPANDING CASE FOR THE UFO, by M. K. Jessup. Citadel Press, New York. 1957. 253 pp. $3.50

SAUCER DIARY, by Israel Norkin. Pageant Press, New York. 1957. 137 pp. $3.00

I don't know what I believe about flying saucers—or "UFO's," to be general. I believe that other stars have other planets, and that there's every reason to suppose there may be creatures on them as well or better able than we to take off into space. I can't see any place in present-day physics for energy sources, means of propulsion, or speeds that would enable such ET's to get from a far star to Earth on a commuting basis—but by the same token, I don't know anything except reflected and refracted light that can change direction with the abruptness and speed to which UFO witnesses attest. I guess I'll be safe and stick with Einstein's statement: "Those people saw something."

One thing is made clear by two of the three UFO books listed above. Flying saucers have taken on the aspects of a cult—very nearly a religion—to many people, and among them the most vocal and possibly the most sincere and earnest. With religion you get revelation, and you just can't argue with revelation, because it excludes logic and reason.

Max Miller's paperback, on the other hand, I'd recommend if you want a sort of summing-up of where the Saucerians stand now. I'm sure the author believes that UFO's are interstellar vessels, crewed by men of some kind and driven by some sort of antigravitational field. Nevertheless, he has done an excellent job of summing up the more significant aspects of the case for flying saucers and listing the things that have to be explained away if you deny there's anything there. He scamps on the opposition arguments, but this is about the fairest presentation by a partisan that I've seen.

Israel Norkin's little book—Pageant is a publisher who is paid by the author or his friends for publishing a book, not one who pays the writer—has another kind of interest. It sums up, rather simply and earnestly, the religious or occultist side of saucerdom. You may get an inkling from it of how so many people can claim to have ridden in saucers or talked with saucer-men, can tell absolutely conflicting stories, and yet all get along harmoniously together. You'll discover that the more tangible aspects of saucer sightings have now become hopelessly entangled with telepathic messages from a person or people called Ashtar, alias Sanat Kumara, "planetary spirit of Venus," alias Sananda, alias Jesus Christ, alias the Elder Brother of the Amethystine Brotherhood of the Seven Rays (headquarters near Lake Titicaca). You'll also get verbal portraits of the people who are the prophets of this school of dogma—whose message is simply, "Stop killing each other, people of Earth, or there'll be no one left to kill."

Jessup, on the other hand, has taken up the banner of the late Charles Fort, but as a crusader rather than a gadfly. Those who knew Fort say that however persuasively he marshaled his outrageous "evidence" for prodigies among us, he kept his tongue in his cheek and bit down hard on it to keep from laughing out loud at the people who bowed down to him as a prophet instead of as an inspired needler of orthodoxy. Jessup, who once taught astronomy and mathematics, is heaping up the same odds and ends of seeming miracles and subversions of scientific law as evidence that some of the wilder tenets of the occultists are fact. And he is so manifestly blinded by his purpose, that he often fails to sound even reasonable.

It's an axiom of the first section, on evidence from meteorological oddities, that vast chunks of ice can fall from an unseen UFO, presumably too high to be visible—but that ice can't fall from an unseen plane. UFO's are said to take the shape of clouds—but clouds can't take the shape of UFO's. Ice that falls from a saucer has strange properties: a pound of it bounces lightly off a woman's head, instead of mashing it to pulp. To accept his argument, bolstered by drawings of the lunar crater Linné, that on June 26, 1868 a mountain suddenly changed into a pit, is to require that the Sun switched from the eastern to the western side of the Moon in an hour and a half (since the sunlit part is on the same side).

The archaeological wing of his arguments is, of course, what gets my own dander up. He takes as proven and uses as evidence a 30,000 to 60,000 year age for the Great Pyramid—when Cheops' name is chalked on the rough stones inside of relieving vaults over the King's Chamber, never opened from the time they were built until 1838. He uses the Churchward-occultist "evidence" that the religious center of Tiahuanaco, in pre-Inca Peru, is 26,000 years old—when all the archaeological cross-checking, backed up by radiocarbon dating, puts the Tiahuanaco empire in the centuries just before 1000 A.D. He states as proven—and thanks Willy Ley for giving him the correct "date"—the existence of fully human pygmies in the Miocene of *33 million* years ago. He seems, here, to be talking about an alleged steel artifact found in an Austrian coal mine in 1877, and he may be drawing on newspaper accounts of the discussion over *Oreopithecus*, the Upper Miocene or Lower Pliocene *monkey* from some Italian coal beds which some anthropologists (see *Science,* August 23, 1957—pp. 345-6) believe is in the direct human line of descent.

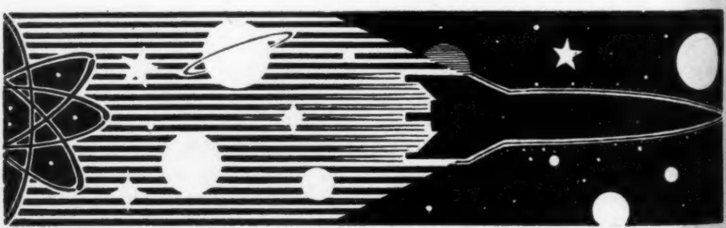
To me, this kind of stuff spoils whatever sound evidence for extraterrestrial vehicles and people may exist. Since Jessup also makes much, especially in his earlier "The Case for the UFO," of strange footprints, I'll give him some personally attested evidence. Saturday morning, August 31, 1957, on the sidewalk outside my house, I found some very peculiar tracks. They were shaped like the "broad arrow" on a British convict suit—two lines of dust, meeting in an angle of something like forty-five degrees. Sometimes the sides of the arrow were straight; sometimes they were concave outward; sometimes there was also a single ridge of dust making a shaft down the middle, bisecting the "V."

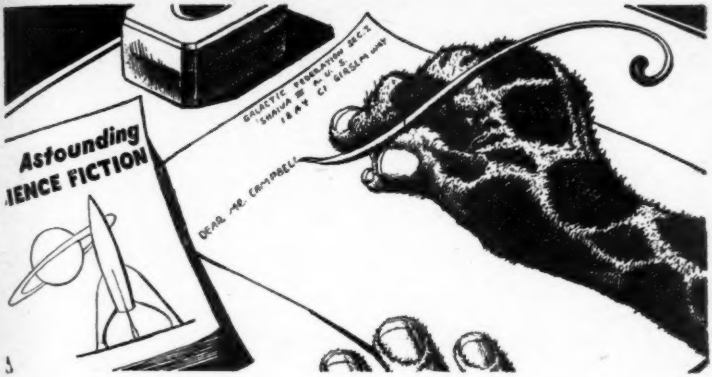
I followed these arrow tracks for a quarter of a mile or so up the street, found others pointing back in the opposite direction—*and found several heading up the walk to my own front door.*

I've never seen anything like this before. There are no such tracks today, two days later, nor did I see any in any other part of town on Saturday, though I looked. Did a monster from outer space, or a little green man from Clarion, stalk up Centre Avenue in Pittsburgh last Saturday? Mr. Jessup may think so. I believe that the combination of drought and heat were such that the grains of dust—perhaps largely soft coal dust—under a woman's shoes became charged with static electricity, and because of some factor in the way she walked, drew together in these converging ridges. I say a woman's shoes because of the size. I think I can say "women," and there may be something about the style and materials in last summer's shoes to make the dust behave as it did.

You won't find such tracks in the textbooks, and I suspect a physicist might have difficulty predicting them. But I don't feel that I have to evoke saucer men, living on invisible ships in outer space after escaping from Earth thirty million years ago, to explain them.

THE END

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BRASS TACKS

Dear Sir:

May I suggest several of "Finagle's Laws"? These are to follow the noble First, which has been given us as:

1. If anything can go wrong in an experiment, it will.
2. No matter what result is anticipated, there is always someone willing to fake it.
3. No matter what the result, there is always someone eager to misinterpret it.
4. No matter what occurs, there is always someone willing to *believe* it happened according to his pet theory.

Perhaps these show a quite humanistic viewpoint, but what else would "Finagle's Laws" be about?

Please let us have the full compilation when it has reached final form.
—J. R. McC.

A compilation will be published, if you readers keep sending material to compile.

Dear John:

Baron Hans von Eisenbeiss, a gentleman at our house back home in Charleston, South Carolina, who happens to be a dachshund, has asked me to send you the following, which seems to be inspired by the Eric

Frank Russell yarn, "Into Your Tent I'll Creep," in your September issue:

Most Illustrious Masters:

It is with the greatest trepidation and circumspection that your servant dare presume to address your most excellent Lordships in any tone which might conceivably be construed by any light as at all critical or carping. Far be it from your servant to dare question your Lordships' more than canine Wisdom! But this poor creature feels it his bounden duty, enforced on him no less by the ties of racial solidarity to the whole canine species than by a lineage not of the meanest, nor an antiquity the most insignificant (but which one may perhaps justifiably boast as being attested by the Records of the American Kennel Club): it is therefore, I must say, my duty, to speak out, if no one else will, to give my species' side of the case.

Those who belittle the great economic efforts expended continually for the maintenance of some of us, against which it is alleged that we perform little or no useful work in return, except the amusement of our masters, might well consider, first, the innumerable farmers, cannery workers, leather workers, insecticide manufacturers, and others, employed in making all this dogfood, flea-powder, collars, leashes, and the rest, and the most regrettable effects upon the general economy that might well ensue upon their sudden unemployment, and second, whether public comedians and entertainers, drawing princely incomes, are in better case than ourselves.

But are we then indeed so useless? When one considers the faithful sentinels of our race who continually guard their masters' homesteads from intruders, the tireless workers who draw the Netherlander's milk cart, assist the busy herdsman, rescue the snowbound traveler, and finally, those unsung heroes of medical research who are all the day long led as sheep to the slaughter, one may perhaps reconsider his harsh judgment.

Moreover, consider what agonies of spirit a dog of any sensibility must feel when he continually hears the once honorable appellation of his womenfolk bandied about among his masters as one of the foulest epithets of the English tongue! Alas, the day of chivalry is dead, and the glory of the West is extinguished forever!

Finally there must be recorded another harassment which we are compelled to endure. Our masters have seen fit, for reasons which we cannot doubt are clear to their most stupendous intellects, to harbor large numbers of a certain race whose principal characteristics seem to be an utter disinclination to any fixed loyalty and a complete incapacity for any useful work; creatures highly destructive of furniture, whose only sounds are a kind of whine or a menacing low-pitched *growl,* by which they are supposed to express their *contentment* (!), and whose alleged propensity for catching rats and mice is more than balanced by their enthusiastic slaughter of songbirds.

Yet whatever calumnies our enemies may visit upon us, we are content to receive them in the same equable spirit that has always characterized our race, among whom there is none prouder that his name should be enrolled than

Your obedient servant
BARON HANS VON EISENBEISS

Herr von Eisenbeiss' opinions are his own and do not reflect those of the undersigned. But what I would like to know is, *who* just chewed up two candy bars, a box of Kleenex, and some nicely bound editions of Edmund Burke, the King James Bible, and Victorian Prose Authors? —Harry W. Hickey.

The unexpected makes life more interesting. He's just making your life more interesting.

Dear Mr. Campbell:

Your October editorial used an analogy to show that it might be possible for a very small change in a society to produce major results. You pointed out that, if the k-factor of a nuclear reactor exceeds a value of 1.0—by even a very tiny amount —the reaction rate would increase tremendously very soon.

Below is a theory I worked out some time ago as to what brought on the Big Depression; what caused the stock market boom and 1929 bust; and how they were related. I used an analogy—skipped here—to a chain letter to illustrate it at the time.

Suppose back in the middle '20s that one person happened to make some "easy" money in the stock market. Suppose his success caused 10 more to try to do the same and a little later caused another 100 to try to do it. The effect of the 100 buying might cause the market to rise enough that the 10 would make money and this might cause 1000 more to enter the market which would result in the market going up still more so that the 100 would make money and so on.

This increasingly rapid withdrawal of cash and credit from its normal use of purchasing goods and services would result in market surpluses, price cuts, and unemployment all the time that the stock market was going up. The publicity given the stock market boom delayed recognition of how bad business was getting.

Finally, the amount of cash and credit that could come into the stock market was insufficient to keep the market going up. Since many purchases had been made on heavy margin, it would take only a few sales to reverse the process as holders tried to dispose of their stocks before the market went down more. This drop occurred very rapidly, although the rise had been more gradual.

The depression which had existed in a somewhat mild form as the market approached its peak was now made much worse since the contraction in credit affected business activity and people held on to their cash in fear of losing their jobs or in the hopes that prices would drop more. This resulted in an even more severe contraction of demand and the Big Depression was on.—William P. Lawson, Box 33, Boswell, Indiana.

In electronics it's called a "flip-flop circuit"!

Dear Mr. Campbell:

This is to call your attention to an article in the October issue of *Electronics Magazine* (volume 30, p. 155) entitled: "Infrared Detector Aids Medical Diagnosis," by W. E. Osborne.

The author states that "infrared detectors of the photo conductive type can record emotions or concentrated thought when the detector is placed within a few inches of a person's head."

The purpose of publication in *Electronics* is to describe the instrument; consequently there is only enough mention about the effects observable with it to be tantalizing.—Donald P. MacMillan, 1530 43rd Street, Los Alamos, New Mexico.

I doubt the value of the correlation. A simple, standard ohmmeter will record changes of skin resistance when emotion or concentrated thought is present—but doesn't give clues as to what emotion, or why.

Dear John:

Finagle's heritage to the scientists is justifiably well known, and it is too bad that we do not have more valid historical information on the development of the Bugger Factor, which is of equal importance to Finagle's Constant.

As indicated by their names, Finagle's Constant is a multiplier of the zero-order term:

$$x' = K_F + x,$$

and the Bugger Factor is a multiplier of the linear term:

$$x' = K_B x;$$

wherein x represents a set of experimental findings and x' the set of desired results. Of course, it was very quickly recognizd that the advantages of both of these terms could be achieved together if the relation is written in the form:

$$x' = K_F + K_B x.$$

I think it is high time that attention is called to the work of the unnoted genius, Roland Featherstonehaugh Diddle (B.S., Fubar College 1928, Ph.D., Miskatonic U., 1932), who first discovered that the fit of experimental data could be improved in practically all cases, by a factor of two or more, if he added to the above relation the quadratic term:

$$x' = K_F + K_B x + K_D x^2.$$

The original account of Diddle's great discovery will be found in his paper: "On the Significance of Random Experimental Data," (doctoral thesis, Miskatonic U., 1932; also printed in the Journal of the Association of Philosophical Engineers, Vol. 12, pp. 872-898, October 1932).

In honor of this great work, I hereby suggest that the multiplier of the quadratic term be hereafter known as the "Diddle Coefficient."
—H. Orlo Hoadley, 1900 Five Mile Line Road, Penfield, New York.

I have understood that there is a different basic structure behind the Finagle, Bugger, and Diddle factors. Also that Dr. Finagle was, actually, a German by the name of von Nagle, who moved to Ireland where his associates misunderstood the pronunciation of his name, while the correct spelling of Bugger is Bougeurre, *the name having undergone a similar Hobson-Jobson transition from the original French.*

In any case, the Finagle (or von Nagle) factor is characterized by changing the universe to fit the equation. *The Bougeurre Factor, on the other hand,* changes the equation to fit the Universe. *And finally, the Diddle Factor changes things so that the equation and the universe* appear *to fit, without requiring any real change in either. This is also known as the "smoothing" or "soothing" factor, mathematically somewhat similar to a damping factor; it has the characteristic of eliminating differences by dropping the subject*

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An example of the von Nagle (or Finagle) factor is the introduction of the planet Uranus; since Newtonian laws didn't agree with the observed universe, the planet Uranus was introduced into the Universe to make the universe fit the equations.

The Bougeurre Factor is typified by Einstein's work on the basic equations of motion and gravity, leading to the Relativity concept, so that the equations were adjusted to fit the observed facts of the orbit of Mercury.

The photographer's use of a "soft focus" lens in taking protraits of women over thirty-five represents an excellent example of the advantages of using the Diddle Factor. By sufficiently blurring the results, they are made to appear *to match the facts in a more satisfactory manner.*

Dear Mr. Campbell:

The first of Finagle's laws mentioned below is, of course, a laboratory discovery and extremely well known; but some of the others, having to do with applied science, are more often encountered only in practical handbooks or even by word of mouth.

FINAGLE'S LAWS

LAW OF THE TOO, TOO SOLID POINT:

In any collection of data, the figure that is most obviously correct—beyond all need of checking—is the mistake.

COROLLARY I: *No one* whom you ask for help will see it either.

COROLLARY II: *Everyone* who stops by with unsought advice will see it immediately.

FINAGLE'S LAWS— APPLIED SCIENCE FICTION

LAW OF THE LOST INCH:

In designing any type of construction, no overall dimension can be totaled correctly after 4:40 p.m. on Friday.

COROLLARY I: Under the same conditions, if any minor dimensions are given to sixteenths of an inch, they cannot be totaled at all.

COROLLARY II: The correct total will become self-evident at 9:01 a.m. on Monday.

FIRST LAW OF REVISION:

Information necessitating a change of design will be conveyed to the designer after—and *only* after—the plans are complete. (Often referred to as the "NOW they tell us!" law.)

COROLLARY I: In simple cases, presenting one obvious right way versus one obvious wrong way, it is often wiser to choose the wrong way, so as to expedite subsequent revision.

SECOND LAW OF REVISION:

The more innocuous the modification appears to be, the further its influence will extend and the more plans will have to be redrawn.

THIRD LAW OF REVISION:

If, when completion of a design is imminent, field dimensions are finally supplied as they actually are —instead of as they were meant to be—it is always simpler to start all over.

COROLLARY I: It is usually impractical to worry beforehand about interferences—if you have none, someone will make one for you (cf. 1st & 2nd Laws above).

That basic First Law of Revision is undoubtedly one of the foundation stones of all engineering, and would be even more frequently quoted were not the subjects so often rendered temporarily speechless by its sheer inevitability. Case histories must number in the billions, but the situation is somewhat befogged by the intrusion of statistics on apoplexy and on drunk-and-disorderly arrests per thousand population.—H. B. Fyfe.

Of course, Dr. Finagle never worked with revisions of type—but maybe he did, and that's why his laws were unpublished all these years.

THE END

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(*Continued from page* 9)

proving the validity of his ideas logically.

Naturally history shows that Right Always Triumphs; the triumphant, not the defeated, write—or should we say "right"?—the history.

The Constituted Authorities normally win; it takes an exceedingly effective thinker, propagandist, promoter, and escape artist to win against them. He's got to be not only a brilliant thinker, but a slick, clever, sly, promoter and super-salesman. Because he's going to have to break through every communication block the united power of the Constituted Authorities can put in his way. Since in any culture, the Constituted Authorities control communication channels—the battle to loosen the grip on communication channels was the battle for Freedom of the Press—the innovator must break through that block to reach the people.

The learned experts in any field are genuinely, and sincerely—and very, very deeply—oriented to believe honestly that the concepts of the field are Truth. To them, very genuinely and sincerely, the danger of the innovator is not simply a matter of "He is attacking our security, our prerogatives, and our position!" but, much more deeply, "He is attacking the great Truths that centuries of patient work and thinking have built up! He is perverting the minds of the ignorant and untutored people! He is a menace to the welfare of Mankind!"

The fact that the people generally, the laymen, are not so deeply oriented to *know* that what the innovator suggests is false makes it possible for them to *consider* his suggestion.

That this type of problem *never* occurs is obviously not a valid statement; it has occurred repeatedly. That *every* innovator is right, and the Constituted Authorities wrong is, equally clearly, not a valid proposal either. Probably something like 99.99% of individuals who say: "You're all wrong, and I am right," is a genuine, no-kidding crackpot.

The trouble is . . . that remaining 0.01% produces most of the breakthroughs in human progress. If we could only find a method of separating the valid innovators, from the original crackpots, that did *not* involve Trial by Ordeal of Harassment, or Trial by Combat of Champions . . . some superior technique of separating the Truth-finders from the Delusion-Peddlers . . . the rate of human progress would be enormously increased.

I believe the essential root of the problem is simply this: we have no way of proving any negative proposition in a non-exclusive domain.

That is; if I say "X is true," and you seek to prove the proposition "X is not true," you are faced with an unprovable proposition—actually, an irresolvable proposition has been introduced—*unless* it can be proven that *either* X *or* Y, *but not both,* is true. Then if you can establish that Y is true, you prove that X is not

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true. If you say, "Springfield is in Massachusetts," this does *not* establish "Springfield is *not* in New Jersey," or any of a dozen other states, because there is more than one valid answer to the question: "In what state will I find Springfield?"

If I ask: "What is the atomic mass of uranium?" and you answer "234," you are not wrong. Even if I establish that there is uranium with an atomic mass of 238, I do not *disprove* your value.

The problem fundamentally is: "How can one prove the statement 'You are wrong!'?"

It can be proven in any exclusive system . . . but to date, *only* in such a system. If I can establish that: "A and only A is the correct answer to the problem Alpha," then, and only then, can I actually *prove* you're wrong, that B is *not* a correct answer.

But *let it be accepted that* A and only A is the correct answer, and the problem of proving the crackpot with answer B is in fact wrong is simple.

The essence of the position of the Constituted Authorities is that they have THE answer. That's what makes them Authorities.

There's a trick, here, however. In our modern world, the Authority of a man is not accepted as proof—as establishing an "A and only A" situation. No modern thinker would defend the proposition that because the great Dr. Bubblefutz said: "A and only A is the answer!" it is established that A and only A is the answer. We've come far beyond accepting the authority of any man. Galileo did succeed in cracking through that barrier, to a major degree.

But there's a tougher and more subtle Authoritarian Barrier that's still very much with us. The tremendously powerful, and subtle, authority of the Cultural Orientation remains!

Most would-be innovators, after a few solid smack-downs, "discover" that there is some organization against them. That there is a collusion, a confederation of organized opponents. Depending on what the would-be's particular field of innovation is, it may be The Bankers, or The Scientists or The Doctors.

The experiences the poor guy has certainly make that conclusion tenable; every Banker—or Scientist or Doctor—he goes to rebuffs him, and does it in the same way, with the same untrue arguments. When a dozen men all tell the same untruth, it is certainly reasonable to suspect collusion. Of course, if a dozen men independently tell the same *truth,* that's understandable.

To the would-be innovator, the arguments he meets are untrue; this gives a strong presumption in his mind that there is an active confederation of opposition.

Any individual, encountering a random selection of geologists or astronomers about 1875, and asking the age of the Earth, would have gotten a dozen untrue answers, which matched each other perfectly. Not because of collusion, of course, but because the culture of that time knew about the Law of Conservation of Energy, and knew the laws of radiation well enough to be able to calculate the maximum period during which the sun could have been giving off energy as it contracted under gravitational forces. That, naturally, fixed the absolute limit of time the Earth could have existed.

They would *know,* with absolutely solid, proven arguments, not mere superstition or crackpotism, that any fantastic period such as four and a half billions of years was absolutely impossible. The Law of Conservation of Energy proved the impossibility of any such idea.

The geologists were, of course, extremely unhappy about the million-year period into which all the geological phenomena had to be crammed—the mountain ranges, before Man's appearance on Earth and establishment of written history, must have been heaving up and down at a furious rate!—but the Law of Conservation of Energy inflexibly proved that it had to be that way.

The dating didn't change until radioactivity came along, and explained that there was a source of energy no one had known about. Shortly thereafter, astronomers had the answer; the energy came from the condensation of hydrogen to helium, and when a star's hydrogen was all gone, naturally it would have to cool off.

Currently, nuclear physics has advanced enough to realize that helium is good fuel in a stellar reactor. It goes all the way to iron.

The innovator is, of course, the one who is suggesting a mechanism depending on a totally new, and completely outside-of-known-limits idea. Galileo, for instance. He's up against the fact that *all* learned, reasonable men *know* that what he proposes is contrary to *known* limits.

It isn't that he's exploring ideas in an unknown area—but in an area *known to be impossible.*

It isn't the authority of any individual scientist that is cited against the would-be innovator—but of *all known* science.

Put it in these terms: If a learned,

highly trained man, who had spent thirty years in study, a thousand years ago, saw a supernova, and some crackpot had told him: "What you see is the explosion of a high-density star, in which the helium reactions have exhausted the light nuclei, and the iron peak is undergoing photo-disintegration, with resultant collapse of the core," the learned man would have gaped in amusement. How could anyone think up such a mess of nonsense words—or suggest any such stupid idea as that! To suggest that this was a mere *physical* thing! Why, anyone who had done any studying of the texts of science would know that this was an immensely significant magical portent! A new star of such astonishing brilliance could only signify an event comparable in importance to the Second Coming!

O.K., friends—go ahead and smile tolerantly at the superstitious old fellow.

Are you a learned man? Have you spent years studying and learning the truths men have worked out over the centuries of study?

Then you are blood-brother to the man of an earlier time, who had, for basically the same motive of driving need to *know,* devoted his years to study and understanding. Had you lived in his culture, you would have believed as surely, as deeply, and as rationally as he, precisely the things he believed.

You have no new method of determining truth; he, too, was using the methods you yourself use—observation, logic, mathematics, and reasoning from known data.

You have no better *method* of analyzing data than he had; you just have more data, and the accumulated results of more reasoning and cross-correlating. In his time, you would have been precisely as sure of the authority of your culture . . . as you are today.

The Galileo Problem isn't simply challenging the authority of individual men—it challenges the authority of the cultural orientation itself!

No modern scientist would trust the word of any man; no authority can be allowed to argue-by-authority today.

That is . . . none but the Cultural Authority. You do, after all, believe

EDGAR RICE BURROUGHS'

BEYOND THIRTY
and
THE MAN-EATER

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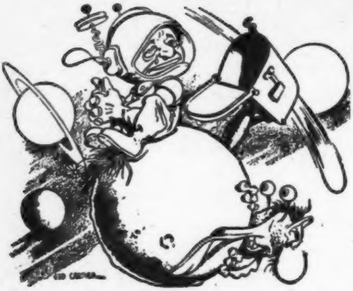

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what you've learned as Basic Truths, don't you?

So did the astrologer of old—and for just as good reason as you believe yours. In fact, for exactly the same reasons; logical reasoning from the observational data, and the records of many centuries.

You have no method of determining the truth that he did not have—your advantage is simply that you've got more of the same. The modern telescope is more accurate in measuring angles than was an astrolabe; it still merely measures angles. It sees better than eyes; it still uses light.

We have not, in the thousands of years since Egyptian priests and engineers worked on their problems, discovered any basically new method of distinguishing Truth from non-truth.

Oh, we can observe new kinds of action; X rays and radio emanations from the galaxies—nuclear disintegrations, and Doppler shifts of the spectrum. But that is merely observing actions, still. Learning the True Meaning of actions, however . . . ?

It might be interesting to consider what would happen if one were added. Say, for instance, a method of proving a negative proposition in a general, non-exclusive domain.

I have a hunch the discoverer would be martyred very quickly. He'd be the first man in history who could say: "You're wrong, and I can prove it!" and really make it stick.

I don't think he'd have any friends at all.

THE EDITOR.

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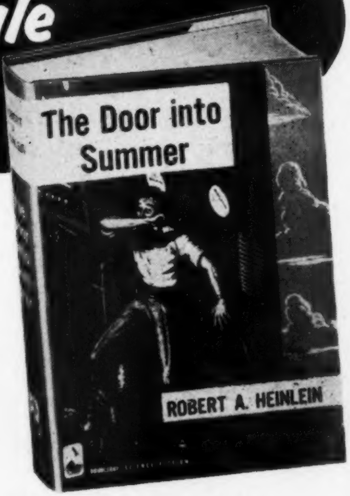

—Continued from Back Cover

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—*Continued on other side*

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